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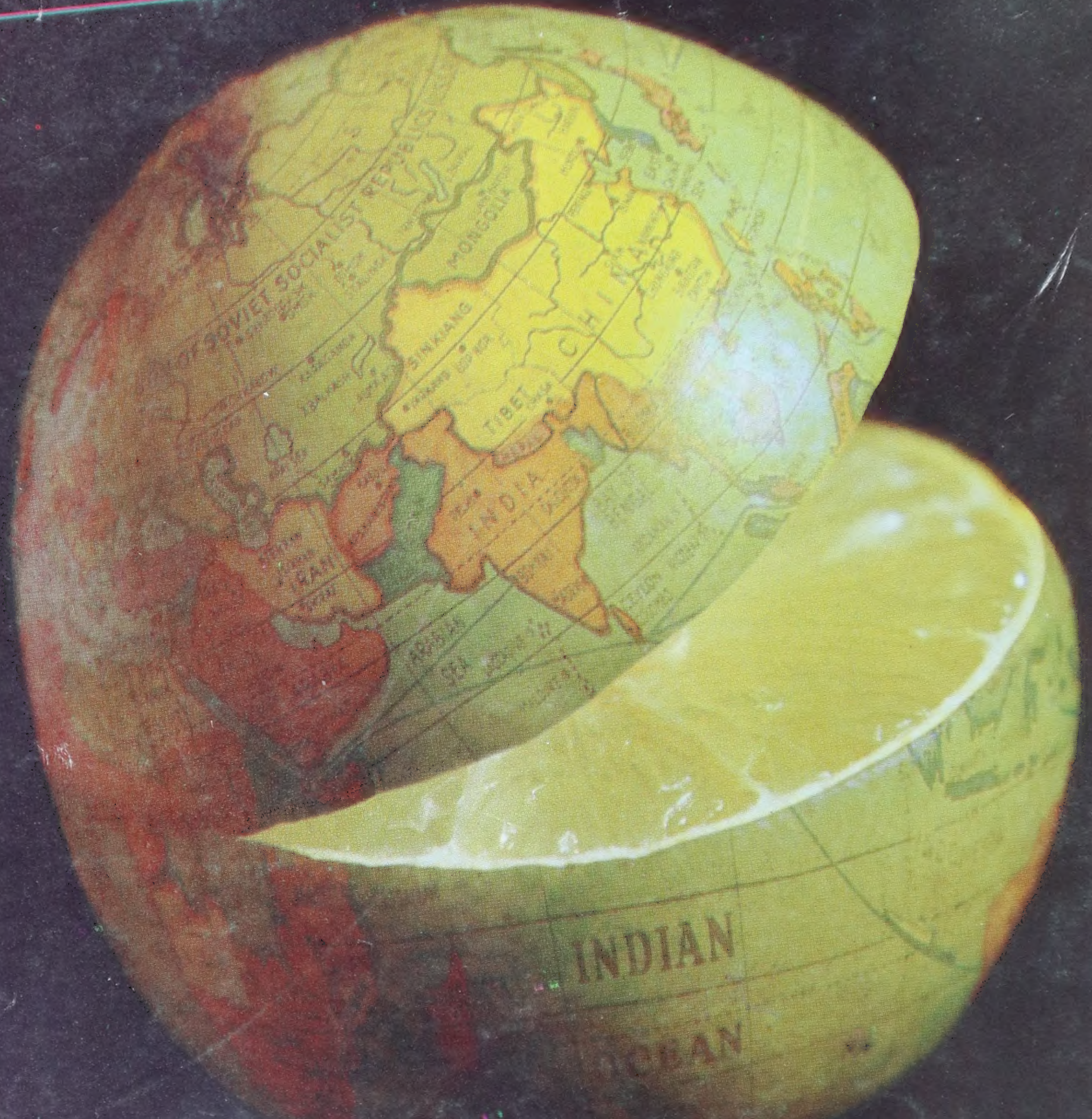

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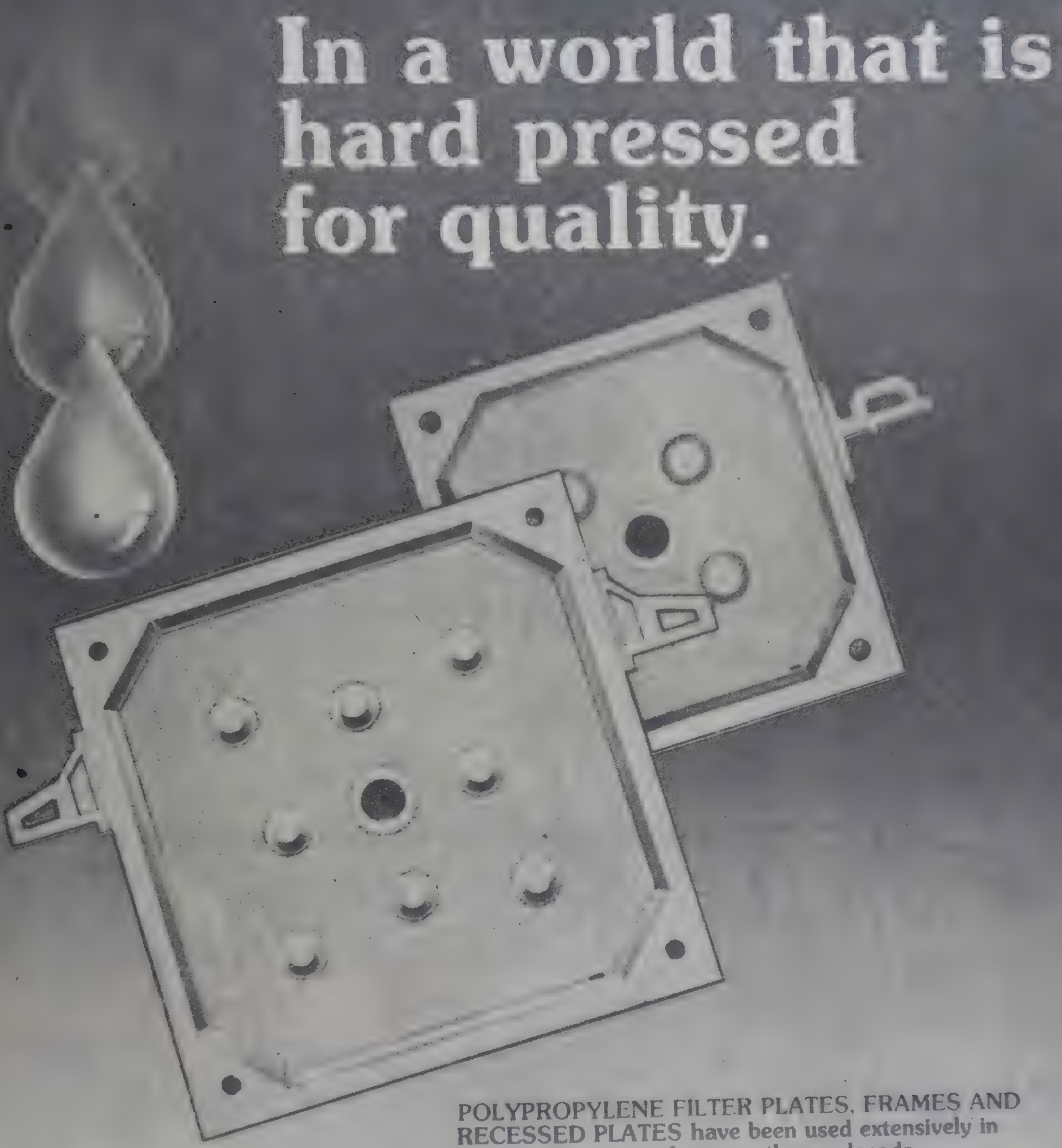
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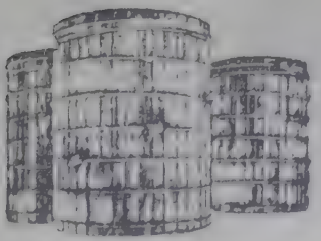

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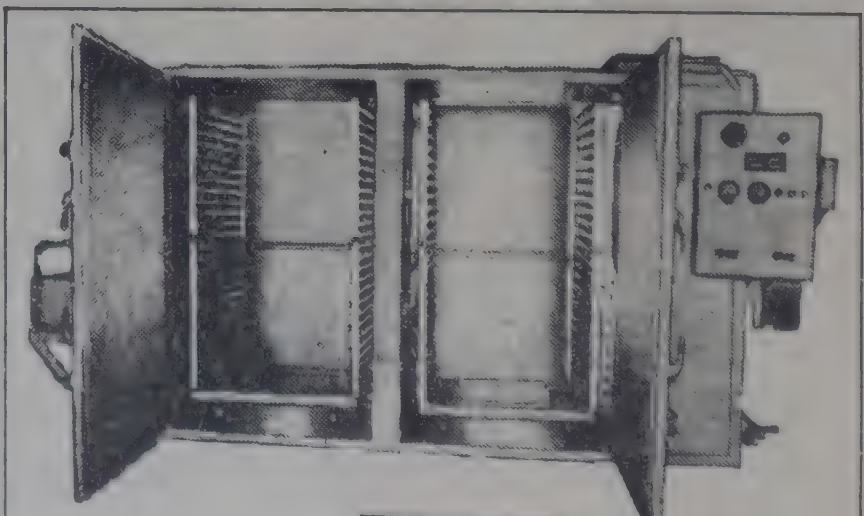

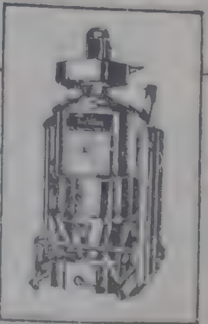

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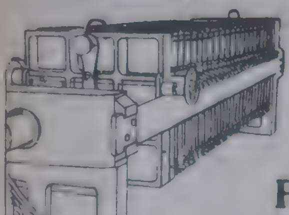

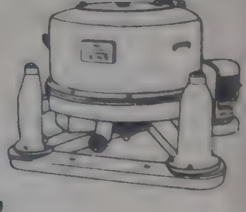

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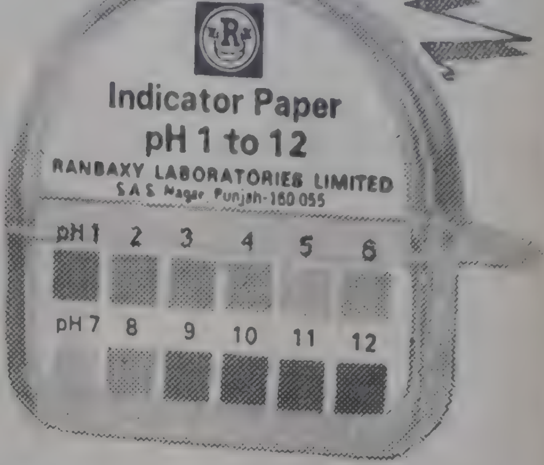

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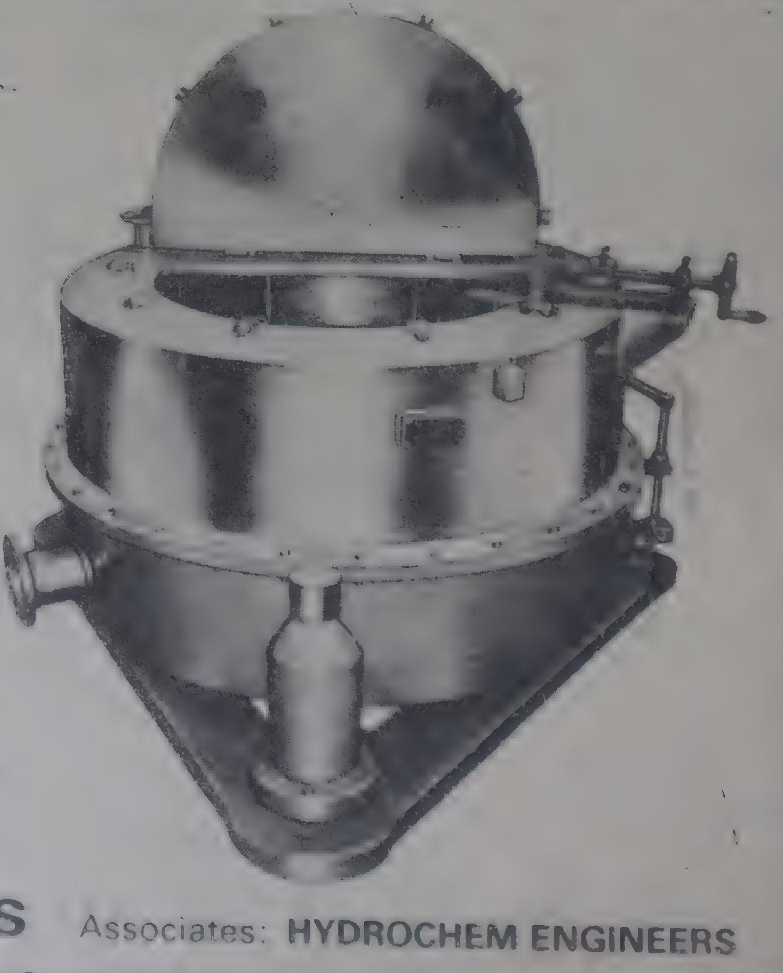

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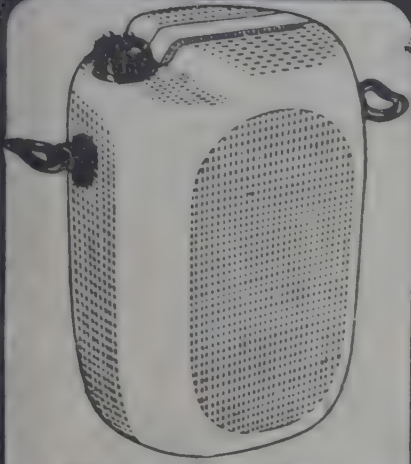
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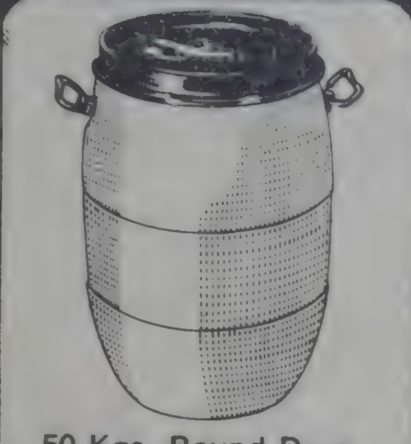
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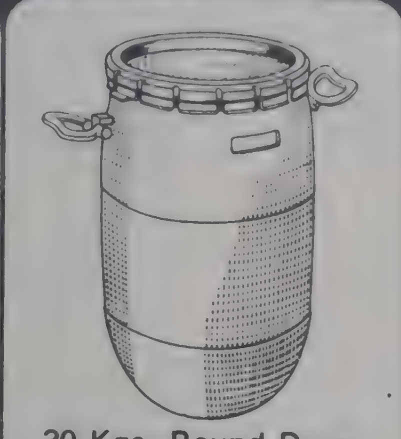
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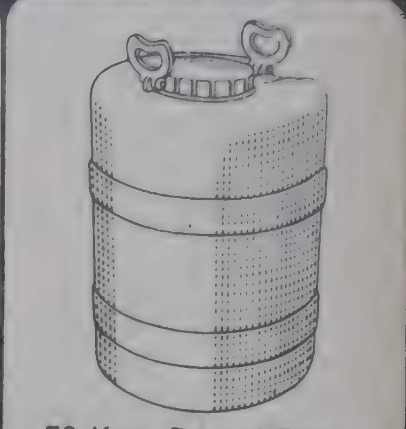
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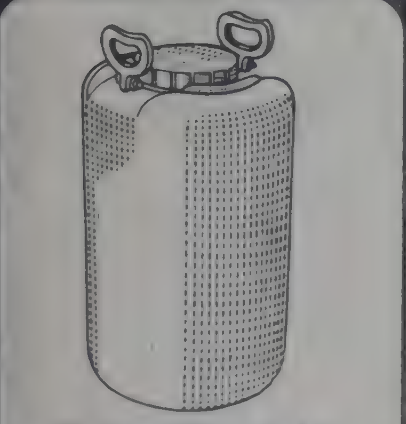
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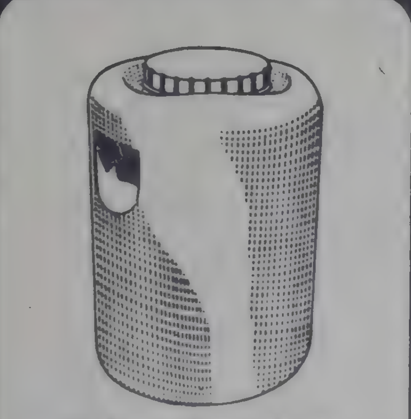
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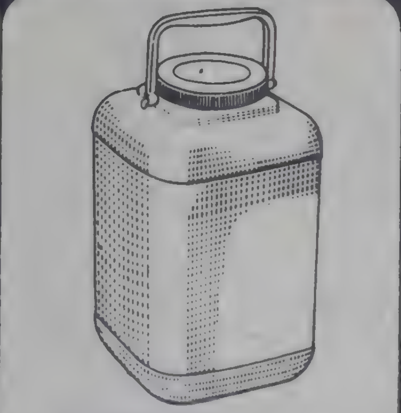
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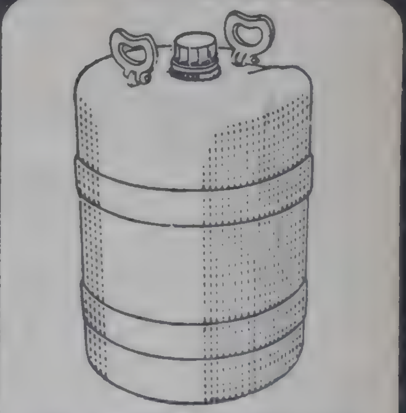
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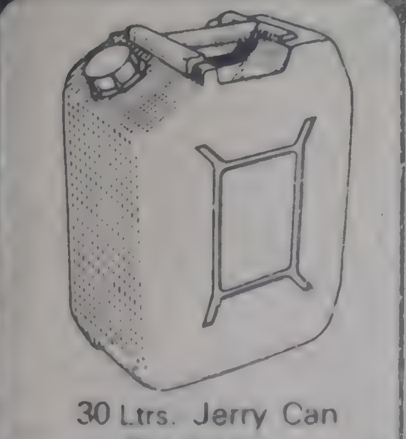
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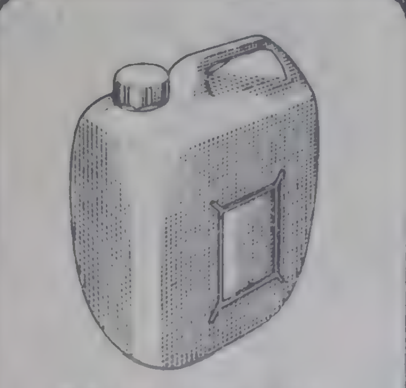
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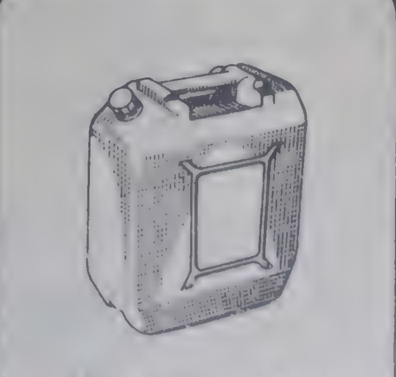
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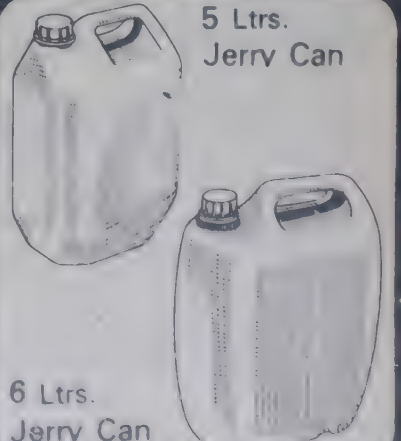
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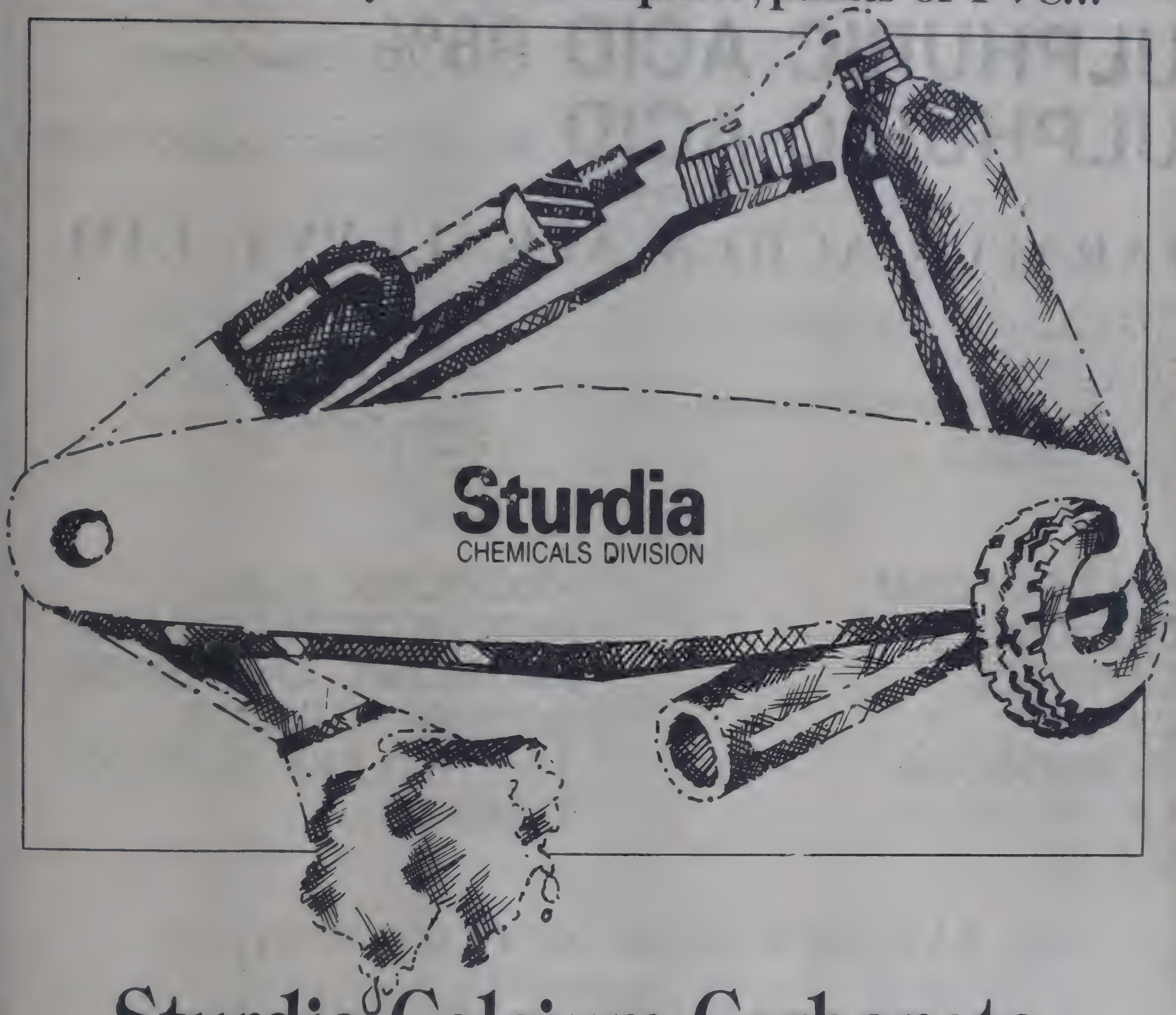

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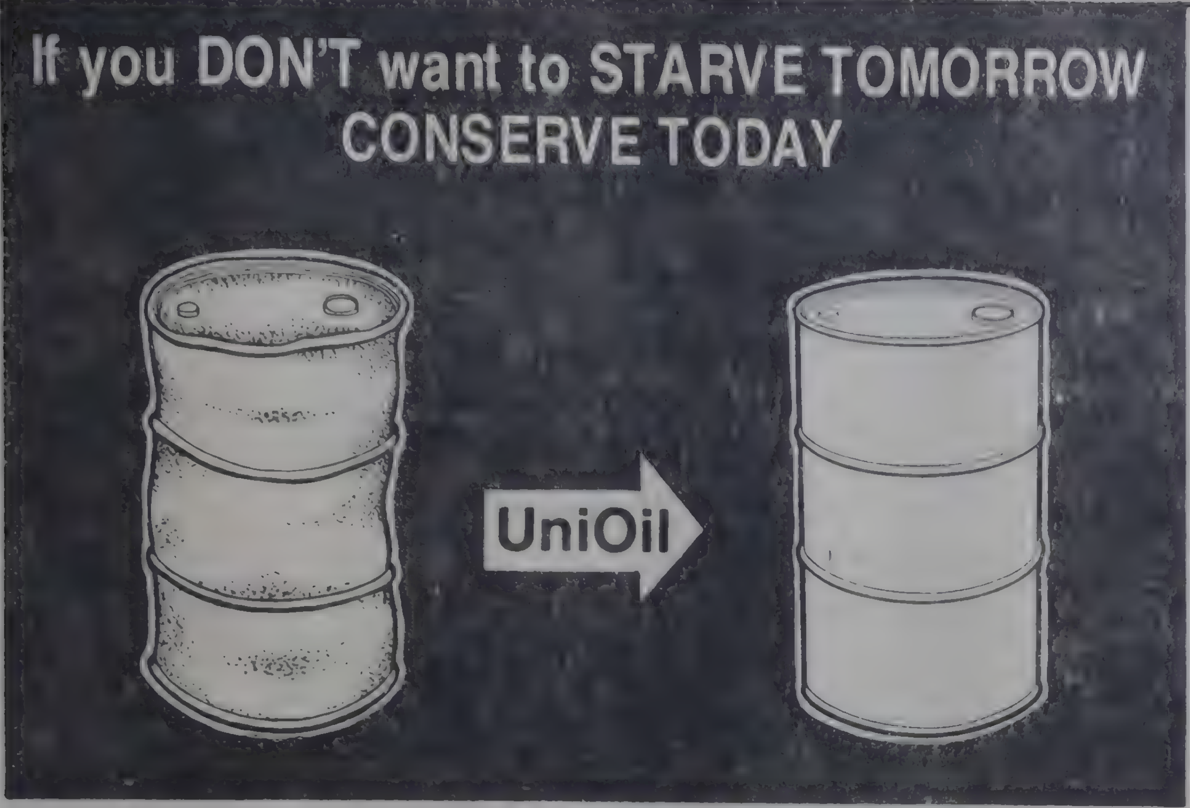
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Sources of supply of Oils & Fats for Industrial Use

World production of oils and fats has risen by annual 4.7% since 1981. Tallow and palm oil, coconut oil and palm kernel oil are of particular significance for the oleochemical industry. The highest growth rates during the last 4 years were for:

* Rape seed oil 9.8% p.a.,
* Palm oil 7.6% p.a.,
* Sunflower oil 6.6% p.a.,
* Butter 5.6% p.a.,
* Soya oil 5.0% p.a.

The development of palm oil may well become particularly interesting for the oleochemical industry, since the C-chain spectrum is similar to that of tallow, while the coupled product, palm kernel oil, is of significance as an alternative for coconut oil.

The increase in butter production will cause agricultural experts within the EEC great concern. The chemical industry is not able to alleviate this problem since the C-chain spectrum of butter does not conform with production facilities of the oleochemical industry.

Tallow, the most important raw material of the oleochemicals industry, is likely to show unchanged growth rates of 12% p.a. After lauryl oils, palm oil has shown the highest development rate. With lauryl oils it must not be forgotten that output showed a low during the years of drought (1983/84) and production has only just returned to normal.

WORLD PRODUCTION: ESTIMATED FIGURES FOR SELECTED OILS AND FATS UPTO 1990, m.t.

	1985	% p.a.	1990
Soya oil	14.7	0.8	15.2
Tallow	6.2	1.9	6.8
Palm oil	6.7	10.9	11.2
Lauryl oils	3.5	7.0	4.9
Rape seed oil	5.5	5.5	7.2

The oil with the highest production figures is soya oil. As far as the oleochemical industry is concerned, palm oil is nevertheless the most important alternative to tallow. On the other hand, soya oil is a "leading oil" since it affects the pricing of other oils. The fact that soya oil is a coupled product from soya meal production, whereas palm oil is the actual production target, will play an important role in the future development and competition between soya oil and palm oil, which shows rapid growth rates in terms of quantity.

Much has been written on the future of the coconut oil industry in the Philippines — a lot of it controversial. One can be certain that the "Tree of God" will continue in its function for a long time to come. On the other hand, the coconut oil producing countries will have to keep an eye on the competing palm kernel oil. In principle, coconut oil and palm kernel oil are alternatives, for example in the food industry

Overall, the increase in the production of palm oil will result in an increase in lauryl oils. This will ease the bottleneck for lauryl oils and its effects on the price structure. Such a development is necessary from the point of view of the oleochemical industry in its competition with synthetic products for example with synthetic fatty alcohols. An additional potential may arise if prices for petrochemical products strengthen and derivatives on the basis of natural fatty alcohols, for example fatty alcohol epoxylates or ether sulphates become more competitive.

Production prospects

The availability of lauryl oils rises by an average 3.5% p.a. above that for the increase in demand by the oleochemical industry, which expects average growth to be less than 2%; moreover, the largest proportion of demand is for C 14. There are no indications of major new fields of application for lauryl based oleochemicals.

Additional oil palm plantations in Malaysia and Indonesia are estimated at 60,000 hectares between 1987 and 1992 while growth of existing areas between 1990 and 1995 is expected to remain unchanged. Average palm oil yields per hectare by the end of the scenario period (1995) will be 4.35 m.t in West Malaysia (compared with an estimated 4.23 m.t in 1990), 3.28 m.t (3.21) in East Malaysia and 3.4 m.t (3.33) in Indonesia. The growth of the area under cultivation shows a noticeable fall compared with 1985, for example 120,000 hectares in Malaysia and 100,000 hectares in Indonesia. It is doubtful, however, whether Indonesia is prepared to limit cultivation to the indicated extent. This is also a question of available capital. In Malaysia, for example, increased production costs may well raise the question of available labour and cultivation area for medium term expansion.

If the expansion of the entire area under cultivation in Malaysia and Indonesia until 1992 continues at the growth rate of 1985 and the average yield per hectare reaches its full potential (for example 4.65 m.t. in Western Malaysia, 3.45 m.t. in Eastern Malaysia, and 3.8 m.t. in Indonesia) the lauryl oil output will increase by lakh tons per year over the current figure.

The medium-term availability and price development of palm oil are of great importance for the oleochemical industry, for example in view of a possible additional demand for the substitution of petrochemical substitutes — a development that it is difficult to assess at present.

The medium term assessment of lauryl oils over 10 years shows that in South East Asia about 35% of lauryl oils will be accounted for by palm kernel oil. An increase of lauryl oils in Indonesia and Malaysia may mean that the share of Philippino coconut oil production falls from about 41% (1985: 1.10 m. t) to 37% of lauryl oil production.

Rapid expansion for oil until 1995?

In how far coconut oil from Indonesia is available remains to be seen; more coconut oil is apparently used internally for food purposes ("cooking oil") so that exports may become subject to export quotas.

In Malaysia and Indonesia oil palms are cultivated on a large scale and almost to industrial standards so that excellent conditions for a strong expansion of palm oil exists. The competitive situation between Malaysia and Indonesia must not be forgotten. The condition in both countries are favourable.

In the continuing conflict between palm oil on the one hand and soya oil on the other the increase in the use to rape seed oil and its rising production in the EEC also plays a part. Other factors playing a decisive role in the possible future expansion of palm oil are the animal feed-meal requirements and the purchasing positions of major importing countries, among them India, Pakistan, and Bangladesh.

Fluctuations of coconut oil prices at certain intervals are a known fact. During times of continuing shortages these were reflected by major price increases. An examination of coconut oil prices over 20 years (1962-1982) for five year periods showed an average increase of 1.3% p.a. This price development was therefore considerably below that of other raw materials, for example crude oil or industrial products and was considerably lower than the inflation rate of most countries. The same applies to tallow which rose by 2% p.a. over the same period. During 1983/84 price fluctuation coconut oil showed extraordinary peaks.

Tallow — like all oils and fats — recorded a dramati in prices in 1986 so that the curve 1962-1987 shows an a age price rise of only 2.1%.

In the medium and short range, conditions are expe to be so that natural raw materials for the oleochemical in try should retain their favourable cost situation:

* Production of raw materials rises faster than consumpt
* The competition of the "major oils" continues, for ex ple palm oil versus soya oil;
* Palm oil expands further at the cost of soya oil, whic affected by the feed-meal situation;
* The availability of lauryl oils is very good: production r considerably faster than consumption;
* Palm kernel oil will be available in markedly increas quantities;
* The substitution of coconut oil by palm kernel oil redu the sensitivity of coconut oil prices;
* Tallow is available in sufficient quantities, even sho production fall;
* Palm oil represents a considerable quantitative reserve oleochemical basic products with a chain length of C should oleochemical derivatives grow faster than hithe

Areas of interaction

Petrochemical and natural raw materials affect each o only to a limited extent: ethylene, propylene, paraffins on one hand and natural oils and fats on the other hand are st ing materials for glycerol, fatty alcohols and fatty acid me esters. In terms of volume there is no comparison if one c siders the amount of petrochemical derivatives and nat substances: more than 110 m.t of petrochemicals versus under 4 m. t of oleochemical starting materials. The two b materials markets — petrochemicals and oleochemicals — marked by characteristic dependencies:

* Both are commodities;
* Supplies exceed demand;
* Their dependence on the dollar parity has an adverse eff
* The utilization of coupled products is decisive;
* Worldwide demand is weak or stagnating;
* The oleochemicals industry is probably competitive those areas where it is in direct contact with the petroch ical industry: both in view of present low mineral oil pr and in particular should prices rise, for example to $ 20/

Fatty acids: No high-quantity users

The development of fatty acid production (without s thetic ones) since 1982, which is recorded at about 5% q titative growth for Western Europe and 8% for the worl a whole, does not reflect a realistic situation, since ou in 1982 was exceptionally low. Development of demand 1990 will be moderate in this saturated market and will a ge between 1 and 1.5%. There are no new high-quantity sers. New sectors that seem to promise new interesting uses, or example fatty acids for "deep well drilling" have not yet materialized since the low mineral oil prices were prohibitive.

The distribution of users over the last three years has emained practically unchanged. There are possibilities of sing fatty acids as raw materials for amines or amine derivtives and for a certain quantitative development of fatty alcools based on fatty acids, and similar marginal development rospects exist for detergents and cosmetics.

It is not yet clear whether in the Western European detergents sector the reduced consumption of soap as an antifoaming agent in detergents — silicone oil preparations are increasingly used — will be compensated by an increased use of soap as a surfactant component in special or liquid detergents. It is too early to assess developments in this sector.

Although "green" circles have started a renewed debate on soap as an "alternative product", there are no signs of a genuine renaissance of soap. Fatty acids for soaps in general do not record positive quantitative developments, although specialities for the leather and textile industries show a slightly positive trend. The development for uses in lubricants, for example, on the basis of ester oils is more favourable. Their wider use is, however, still blocked by higher prices. Nevertheless, ester oils are, because of their favourable properties, a valuable addition to classic lubricants.

Certain changes have emerged in the American market, for example, where liquid detergents have gained higher market shares. There are still no suitable uses for the surplus of C_8/C_{10} fatty acids. Interesting possibilities exist for the use of medium-chain triglycerides (MCT) in special diets, for example in foodstuffs for seriously ill patients. It is not yet certain, however, whether these products will become important in terms of quantity. MCTs could be used as easy to digest and absorb triglycerides, so-called quick energy sources, with low cholesterol contents.

World production in 1985 amounted to 530,000 tonnes. Worldwide applications show small growth rates only for pharmaceutical and cosmetic products, polyols, tobacco, and foodstuffs. There are no new applications where large quantities might be used. The price of glycerol, which showed a short-term peak, is so high that it precludes substitution: glycol, TMP and sorbitol are cheaper and will remain so.

Glycerol: Only 80% capacity utilization

The average growth rate of glycerol is about 1%. Bearing in mind a capacity of 650,000 t capacity utilization is only just above 80%. The relationship between natural and synthetic glycerol is of a special nature, since natural glycerol is a coupled product of fatty acid, fatty acid methyl ester, soap and natural fatty alcohol production. 80% of output in 1985 came from natural sources. Since natural glycerol is yielded as a matter of course through the production of natural oleochemicals, production of synthetic glycerol has to be cut back. In 1990 the share of synthetic glycerol is likely to be as little as 80,000 t.

By the mid 1990s synthetic glycerol will have lost its buffer position. Synthetic glycerol would then no longer have a market, since the coupled product, glycerol, will have to be sold independent of market position or price. This assessment is based on conventional developments in the case of automatically yielded products; it does not take into consideration possible spectacular increases, for example glycerol from the production of methyl esters as diesel oil substitutes or for sulphoester, or for sucrose polyester on a large scale, for example as low calorie fat. If such projects were to be realised, large amounts of glycerol would be yielded that could not be marketed.

Diesel from fatty acid methyl ester

Fatty acid methyl esters are primarily intermediates for the production of fatty alcohol, since only about 20% is used for other applications: alkanol amides, lubricants, ester, leather auxiliaries, etc. Fatty acid methyl esters were only partly able to replace fatty acids, although they have a number of advantages over the latter: better stability to storage, easier fractionation, reduced corrosiveness and lower energy costs for their production. Their development therefore is linked to that of fatty alcohols and is likely to be in the region of 2%.

The other fields of application, for example for alkanol amides, are characterised by low growth rates since, for cost reasons, triglycerides are frequently used as the basis for alkanol amides or the additives are no longer in demand.

Quantitative growth would be significant if methyl ester were to be used, for example as diesel substitutes. Fatty acid methyl ester could easily be used as tractor or truck fuel as was shown by fleet tests. Their use as triglyceride additives in diesel is more favourable, for example, than the so-called "Coco diesel" which leads to the formation of residues. Methyl esters have been tested as total substitutes and, more frequently, as diesel oil additives.

Sucrose polyester and ester sulphonates may also become major fields of application for methyl ester. Although highly industrialized countries tend on the one hand, towards an increased consumption of fat because of the improved taste and greater ease of producing foodstuff, there is, on the other hand, a desire of not wanting to know about the consequences. So-called low calorie fats, among them sucrose polyester, are now under consideration since they are not digested by the pancreatic enzyme or metabolized like triglycerides of normal chain length; moreover, they do not contribute to the formation of cholesterol.

Of all these long term projects, ester sulphonates have probably the most realistic prospects of becoming part of the development of the oleochemical basic material fatty acid methyl ester; within the period under review they would, however, figure only as quantities with an upward tendency. In 1985 output of fatty alcohol reached 760,000 t. America continues to be the world's largest market with over 50%. The development of this oleochemical basic material until the end of the present decade is a moderate 2.4% p.a.

Worldwide surfactants still account for the largest field of applications. They represent the impeller for fatty alcohol consumption: about 70% of fatty alcohols are used to make surfactants.

Surfactants: Impeller for the use of fatty alcohols

At best, this sector will show a growth of 2.8%, while no growth is anticipated for the numerous chemicotechnical applications, such as amines, chlorides, phosphates, aldehydes, propionates, esters, textile and leather auxiliaries. One reason for this prospect is the competition between fatty acids and fatty alcohols for amine production. Copolymers (for example POA) compete increasingly with fatty alcohols as viscosity improvers. Prospects in the cosmetics industry, on the other hand, are more favourable: for example, in consistency factors, oil components and ointment bases.

Alkyl polyglycosides may become an interesting new surfactant with promising properties for detergents. They have not, however, reached the commercial realisation stage. Their ecological/toxicological properties are interesting, and a major argument in favour of their use is the fact that they are made from natural raw materials (starch and/or glucose and fatty alcohols). Because of increasing fatty alcohol capacities in Western Europe and Asia their utilisation is falling to an inadequate 64%. The fatty alcohol scene is therefore approaching a competitive situation that is comparable to that of the mineral oil refineries or to fatty acid production before large scale streamlining took place in Western Europe. Unfortunately, there are no prospects during the next few years for fast quantitative growth in new markets or new applications. This situation is obviously ignored in new projects.

The new capacities in Western Europe and Asia will shift the ratio of natural and synthetic fatty alcohols to about 1:1, since all seriously considered or planned expansion projects are based on natural raw materials.

Fatty amines: Acceptable growth rate

World output in 1985 amounted to 350,000 t. Amines are oleochemical basic materials with a still acceptable growth rate of 4%. It is likely to be below 5% in Western Europe and the USA, but above average in the rest of the world. The range of applications remains unchanged. The importance of amines for the detergents industry was slightly retrogressive, while biocides showed an increase as substitutes for toxic substances. In 1985 about 4 m. t of oleochemical basic materials were produced (this is an unadjusted figure, since about 80% of fatty acid methyl esters are processed to fatty alcohols). It is estimated, with a realistic assessment of prevailing factors, that this volume will grow by about 1.8% p.a. to 4.4 m.t by 1990. The latest review indicates the demands of the oleochemical industry are expected to rise — not lo because surface active agents made from natural and renc able resources by the oleochemical chemistry are conside to be more environmentally friendly in terms of biodegra ability than similar materials produced by the petrochemi industry.

Developments for the future

Three trends that may become more significant in the futu are: new oil-bearing crops; oils of more controlled comp sition or higher purity; and oils considered to be particula health promoting.

New oil-bearing crops. There are several factors drivi the interest in new oil-bearing crops. The current supply oils and fats is geared mainly to the needs of the food indu try and may not produce the best starting materials for t oleochemical industry. For example, the rape seed grown produce an edible oil has been bred to contain little or erucic acid (1) but this is an important material used as amide in plastic manufacture. We still need, therefore, to gro plants which are a rich source of this acid. These include oth varieties of rape and new crops like *Crambe abyssinica.*

Palm kernel oil and coconut oil are characterised by the high content of lauric (dodecanoic) acid. Coconut oil ha proved to be very variable in quantity and hence price becau of climatic and political instability in the major country origin — the Philippines. Attempts are being made to ove come this difficulty in three ways: (i) the biotechnologic modification of rape so that its seed oil has a fatty acid com position similar to that of coconut oil; (ii) the domesticatic of wild species of Cuphea, which are very rich in the mediu chain acids (C_8-C_{14}; and (iii) the production of seed oils the umbelliferae (e.g. coriander). These seeds are very ric in petroselinic acid, an isomer of oleic acid (2) that can l oxidised to lauric (3) and adipic acids (4).

Other new crops include jojoba which grows in arid regio and produces a waxy ester that can be used in cosmetics as a lubricant; meadowfoam — an oil rich in C_{20} and C acids with high oxidative stability; and oils containing epox cids. There has never been a better time for trying to intr duce new crops. Because of higher yields, requirements c be met from smaller land areas and farmers throughout t developed world are looking for new uses for arable lan

$CH_3(CH_2)_7 = CH(CH_2)_{11}\ COOH$
(1) Erucic acid (cis-13-docosenoic acid)

$CH_3(CH_2)_7CH = CH(CH_2)_7COOH$
(2) Oleic acid (cis-9-octadecenoic acid)

$CH_3(CH_2)_{10}COOH$
(3) Lauric acid (dodecanoic acid)

$COOH(CH_2)_4COOH$
(4) Adipic acid (hexanedioic acid)

— T.P.S. RAJA

(Source: *Chemische Industrie International and Ch*

CHEMARENA

L. VENKITESWARAN

AIDS — Acquired Immuno Deficiency Syndrome — massive research efforts

AIDS is the subject of massive research work on several
es. One report mentions that over 5000 research papers
ere published on this last year, and 57% of them in USA.
e main trends of research work are on the HIV (Human
mmuno Deficiency Virus) transmission, the social, ethical
d legal problems, the simian version or SIV, the potential
various drugs under development and now the advent of
is disease in the third world.

An article in *Readers Digest* mentions the increase in the
sease world-wide and spread to more countries. Accord-
g to WHO, about 6 million world-wide may have been
fected with the virus and the figure will reach 15 to 20 mil-
on by AD 2000 -- although not AIDS affected. The infected
ay get AIDS ultimately. There are an estimated 600,000
ho have contacted AIDS and this will reach a million in
e nineties. India is relatively safe now but Thailand reports
mpant rise in HIV positive cases. As of end 1991, USA
ad 480,000 with the disease, 100,000 in Asia and Oceania,
00,000 in Europe, a million in Latin America and 2.5 mil-
on in Africa which has gifted AIDS to the world. The larg-
st source of infection are I.V. drug use, homosexual contacts
nd blood transfusion; quite unlike the epidemics of old such
s malaria, TB and leprosy. There is fortunately no revival
f small pox. There is a long period of latency between infec-
on and the symptoms. There have been remarkable devel-
pments in testing and the trials and controlled treatment with
e newer drugs which have had quick approvals with AZT
ominating the scene and others like DDI, D4T, and DDC
n the line.

HIV is a very complex virus able to penetrate T4 cells cru-
al to the body's immune system. Once this invasion takes
lace it is a question of months to 2 years before the person
uccumbs to secondary infections which hold sway. T4 cells
ave a protective membrane which must be penetrated and
protein termed CD4 figures as the agency for such pen-
ration. Now one line of attack is to provide CD4 from out-
de (made through biotech methods) to "flood" the blood
nd immobilise the HIV. A drug from the root of Chinese
ucumbers called Compound Q is suggested and taken up
r trial in USA. Protease blocker enzyme are an area of pro-
ise. But a vaccine is not yet on the horizon. But the costs
e astronomical.

There are regular international conferences on AIDS and the sixth one held in June in San Francisco exuded confidence that an effective vaccine may be available by end of 1990's though a cure for HIV infection is nowhere in sight. The International AIDS Society organised the conference and is extremely critical of the social and political action on immigration/compulsory testing, lack of access to US health care systems, and discrimination against the AIDS infected. The happy feature is the scale of finance for research -- $ 1.7 billion in fiscal 1991. AIDS research, prevention and education ranks only below cancer in financial support.

After years of uncertainty there are now hopes for an effective vaccine by AD 2000. Simian Immunodeficiency Virus -- SIV -- in rhesus monkeys (India does not export them now) and a demonstrated vaccine to protect rhesus monkeys has given rise to optimism. But problems on divergent strains even of SIV and the duration of protection remain to be looked into. The protein GPL 60 of Genentech is the core of the viral cover but did not help while a soluble recombinant version GPL 20 is said to be useful. There is enormous work on the mechanism of anti-bodies and their way of protection. The Nobel Laureate, Dr. Salk, focusses attention on post infection immunisation strategy for control of AIDS using an inactivated HIV stripped of its GPL 20. Studies are said to have started. But "HIV" is a trickier virus than most. Not only does it change structure rapidly to evade immune system but also has the immune system itself as a target. There is much need ahead on the design of a useful vaccine.

"The goal for nineties is a lofty one -- ability to completely and indefinitely suppress HIV in infected individuals", but this is years away. A combination of drugs -- some for tackling the opportunistic infections -- are perhaps required but the costs are astronomical. A combination of drugs could counter at different stages of development but principally the need is to block viral expression in cells already infected. The approved drug, nucleoside analogue of Burroughs Wellcomes, AZT, has also adverse reaction in some cases and many are unable to tolerate the drug. The dosage is 1200 mgm per day but lower levels are being tried due to the high cost. Resistant strains are also reported. The great hope is on soluble CD4 protein which is not toxic but has no autoretroviral effect -- only functioning as a dummy target for HIV.

But it gets rapidly removed in the blood and formulations with longer serum half-life are being developed. CD4 also is being tried as a guided missile to deliver toxin directly to the affected cell -- using exotoxin A from soil bacteria. What succeeds *in vitro* does not necessarily do so in the blood stream.

HIV infects several cell types but the infection of T4 lymphocytes is lethal. Much is known about the functioning of retroviruses like HIV (which reproduce from RNA and not DNA). "AIDS has revolutionised thinking about antiviral agents" but that is of no immediate help. There is work on tumor-necrosis factor alpha (TNF alpha) secreted by monocytes and macrophages in response to infections which could counter HIV infections from spreading. Interleukin-6 is to be useful and a combination of TNF-alpha and IL-6 app to be more effective.

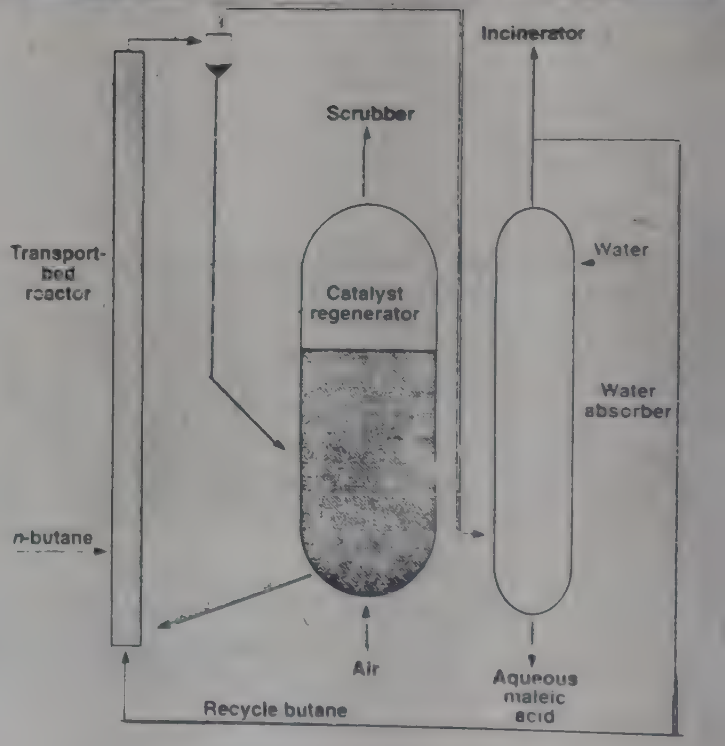
Perhaps the next International Conference in 1991 in F ence or the one in 1992 at Boston may have more suc to report. Certainly more is known every year on how disrupts the immune system and this is the base for cor over those with HIV infection but not yet AIDS victi

Male homosexuals are 61% of the victims and intra nous drug users are 20% and certainly change in lifest is more important than drugs. The cost of treatment reported $ 3,200 per year on a 500 mgm dosage per

Du Pont's Maleic/TetraHydrofuran Process

Du Pont has broken new ground in the oxidation of n-butane to maleic anhydride by a design of reactor with catalyst regeneration system similar to the well-known FCC systems for refineries. (Reference has already been made in these columns earlier). Now Du Pont is going ahead with plans for a giant unit for MA and THF in Europe in 1994 (in Spain). The maleic anhydride from butane uses a specially coated catalyst to reduce attrition in the transport bed system -- (illustrated in Figure). Yields are claimed to be 70 to 75% as against reported 50 to 60% from the competing processes. The catalyst in Du Pont process is oxidised outside the reactor and transported to the reactor to oxidise butane. This avoids the burning taking place in a fixed bed or fluid bed reactor. Also the reaction rate is improved due to the absence of nitrogen or air. Vanadium phosphate is the catalyst but a special method of coating with polysilicic acid to give a porous silica shell cuts down on loss of activity while mantaining the mechanical integrity. In fact such a system could be applicable to other oxidation reactions as well.

DU-PONT TRANSPORT-BED BUTANE OXIDATION



The hydrogenation of MA to THF is also a specially designed one-step process. The hydrogenation is of aqueous maleic with a proprietory rhodium-modified palladium catalyst at high rates and moderate pressures. The process would be less costly both in capital and operating costs. Du Pont is already world leader in THF with half of world capacity and this is the first unit for Du Pont's production in Europe of THF. THF is the intermediate for polytetra methyl ether glycol (PTMEG) used for urethane systems and for Du Pont's speciality fibre, *Lycra*. Du Pont is said to have 70% o market of 95,000 tonnes of world market for PTMEG

The Du Pont lower cost conversion has attracted atten from others and Monsanto who were associated in s stages of development may join in the venture for M

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THAPAR-DU PONT PROJECT

Deadlock over export commitment

A deadlock has arisen between three Union Ministries — finance, industry and petrochemicals — on the issue of export commitment of the controversial Thapar-Du Pont project to produce nylon 66.

While the Finance Ministry is insisting that the American multinational should agree to export at least 70 per cent of its domestic production, the Industry ministry is finding it difficult to convince the producers to export even 42 per cent. The Ministry of Chemicals and Petrochemicals also feels that a 70 per cent export commitment should not be insisted upon.

The project is still with the special Project Approval Board (PAB), but no final decision could be taken on it till the deadlock on the issue of export commitment between different ministries is not broken.

The other issue of contention is the ratio of nylon tyre cord exports to the exports of the goods as a whole. With 42 per cent total export obligation, the share of nylon 66 would be about 20 per cent. The Finance Ministry is insisting that the export of nylon 66 should be higher.

The Finance Ministry has taken this tough stand due to the deteriorating balance of payments position of the economy. Sources claim that the Finance Ministry is insisting that the project should finance its foreign exchange requirements. After its clearance from the special PAB, the project will have to go to the Cabinet Committee for Economic Affairs as the total cost of the project is likely to exceed Rs. 200 crores, the upper limit under which PAB can clear a composite project.

According to sources, a 42-per cent export obligation would involve a foreign exchange drain of $150 million. Seventy per cent export obligations, on the other hand, would mean almost nil hard currency drain. Official sources claim that the authorities' hardened attitude is not typical with the Thapar-Du Pont project. In the past few months due to the deteriorating foreign exchange reserves, all the foreign collaboration agreements have been more strictly scrutinised than was done so far.

In all the foreign collaboration agreements, the issue of utmost priority is the foreign exchange outgo. In case the foreign exchange outgo is more than Rs. 2 to 3 crores, a very close scrutiny of the projects is made, and projects with more than Rs. 20 crore foreign exchange outgo are rejected outright.

Crude official estimates are that in the past three months as many as 50 per cent of the foreign collaboration applications have been rejected. A large number of rejections were made on the grounds of poor foreign exchange position, although the official explanation was not the same, claim the officials in the directorate general of technical development. Rough estimates are that out of about 200 applications for foreign collaboration agreements received as many as 100 were rejected.

SHRIRAM FIBRES PLANS Rs. 18-CRORE UNIT IN TN

Shriram Fibres Ltd. (SFL) is planning to put up a Rs. 18-crore project in Tamil Nadu for the manufacture of hi-tech engineering plastic items. According to sources, the items proposed by the company will be manufactured for the first time in India.

The government has approved the project. The company is yet to decide the exact location of the plant though it has adequate infrastructural facilities, including land at its present factory site in the fast-emerging petrochemical complex at Manali. The govern approval is for the establishment o plant at a permissible area of Chi put district of Tamil Nadu.

The items of manufacture inc polyphenylene sulphide polyme powder, suspension, pellets and forms) with 1000 TPA capacity sodium chloride (by-product) with TPA capacity. It is learnt that the nology needed for these hi-tech i has been indigenously developed b Poona-based National Chemical La atory with whom the SFL is tieing know-how. Side by side, in-h R & D will also be developed by company.

The project cost is to be met thr debentures Rs. 6.60 crores, rupee l Rs. 6.60 crores, FE loans Rs. 1.20 res and internal accrual Rs. 3.60 cr

Since the know-how is indigeno available, the government has ma clear that no foreign collaboration be allowed. Sources said there is a scope for the products envisaged i project, though the exact demand tion is not readily known.

The company belongs to the Ram, large industrial house of D whose assets at 1987-88 stoo Rs. 685.36 crores, according to a l statement in the Rajya Sabha. group's total turnover in that year Rs. 949.53 crores and the PBT sh as (-)2.21 crores.

SFL was established in 1970 an activities included manufacture of n industrial yarn, tyre cord/fabrics, be nylon moulding powder in tech collaboration with a US company sales/services in 1986 stood at Rs. lakhs and gross profit was Rs. 77 lakhs and net profit Rs. 301 lakhs. 1984 to 1986, dividends dec worked out Rs. 115.28 lakhs (18 for each of the three years. The pany's assets was Rs. 103.11 lak 1986.

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MRL proposes second refinery near Manali

Madras Refineries Limited (MRL) proposes to set up a second refinery near Manali. It also plans to develop a petrochemical handling terminal in Ennore, near Manali.

Mr. H. Krishnamurthy, who recently took over as chairman, said that preliminary reports had been sent to the Centre on both these projects, which together are estimated at Rs. 1,000 crores —Rs. 800 crores for the second refinery and Rs. 200 crores for the Ennore complex.

The cost of the second refinery was estimated a few months ago and as per indications, the likely cost will rise to Rs. 1,000 crores. The company plans a three million tonnes capacity for the second refinery. The present capacity of MRL is 5.6 million tonnes, which, after debottlenecking will go up to 6.5 million tonnes by 1991-92.

Called the 'east coast refinery' by corporate planners in MRL, the second unit will take at least 36 to 40 months for completion. Formed in 1965, MRL is the ninth refinery in a chain of 12 in the country and the third in the south. It became operational in 1969. It was a joint venture between GOI, an Iranian company and 'Amoco' of the US. "Its initial throughput was 2.5 million tonnes and since then it has gone up to 5.6 million tonnes. MRL's present refining capacity is 12 per cent of the country's capacity. Its paid-up capital is Rs. 114.13 crores.

On the need for a petrochemical terminal at Ennore where there is a move to float a satellite port, Mr. Krishnamurthy said the complex could be used as a base for importing LPG to meet increasing local demand. It could also pave the way for starting many value-added industries like propylene, polypropylene, and acrylic nitrite chemicals. Within a few years, the investment on this project could be recovered, he added.

Mr. Krishnamurthy plans to focus on strengthening marketing strategies of the organisation. According to officials, once MRL is given the green signal to market its own products, it will be able to show a turnover of Rs. 1,300 crores and above. At present, most MRL products are marketed by IOL etc.

MRL plans to work beyond crude distillation at the Cauvery basin for which it has been given the go-ahead by the Centre. Distillation facilities will be set up near Nagapattinam at Rs. 114.30 crores to process five lakh tonnes per annum of crude which is now transported to Manali (350 km).

Mr. Krishnamurthy said that from the Nagapattinam plant, besides other products like LPG (7000 tonnes), kerosene (8000 tonnes), diesel (130,000 tonnes), furnace oil (80,000 tonnes), there is potential of extracting one lakh tonnes of naphtha which can be converted into LPG (99 per cent) by pumping an additional Rs. 30 crores for that project. In two to three years, he said this investment could be recovered.

Of the 0.18 million cubic metres per day (mcmpd) of associated gas that is available every day, ONGC is already committed to supply 0.088 (mcmpd) to some units and by the turn of 1994-95, this will increase to 0.206 (mcmpd). Production will go to 1.60 mcmpd by 1994-95, of which 1.44 mcmpd will be available, in 1990-91.

Even if 25,000 tpa of LPG is taken out, the balance of nearly 1.55 lakh tonnes could be used for starting silicode factories and for power plants. Another Rs. 25 crores may be needed for this venture. But here the problem is that GAIL seems to be having its own ideas and plans which has to be sorted out by Mr. Krishnamurthy.

The advantage of converting naphtha into LPG at Nagapattinam is mainly to avoid transport costs. Mr. Krishnamurthy said both the ongoing projects, modernisation, removals etc., and new ones will all need Rs. 650 crores in addition to Rs. 88 crores for the aromatics project as MRL's equity. This Rs. 738 crores is sought to be met mostly through internal resources and raising public deposits.

Retaining profit plus depreciation minus payment to government etc., will yield Rs. 555 crores and the projected amount from public deposit is a little above Rs. 180 crores. The pattern of investment of Rs. 738 crores during the Eighth Plan includes elements like lube oil augmentation (Rs. 162 crores), Nagapattinam distillation facilities (Rs. 113 crores), aromatic project (Rs. 88 crores) and modernisation of steam and power (Rs. 120 crores).

MRL has, for the Eighth Plan and onward, envisaged projects which will need an investment of Rs. 4,070 crores (including the aromatic unit of Rs. 1,356 crores). Of this, MRL has proposed an outlay of Rs. 1,011 crores during the Eighth Plan period. Mr. Krishnamurthy said that by the end of the Eighth Plan, the aromatics plant will have a throughput of 29.438 mt, which will yield a sales turnover of Rs. 7,422 crores and after meeting all manufacturing costs and depreciation, gross profit will come to Rs. 577 crores and net profit after tax to Rs. 299.28 crores. After providing for dividend, retained profits at the end of the Eighth Plan will be Rs. 179.48 crores.

MRL to spend Rs. 720 crore in Eighth Plan for aromatics project

Public sector Madras Refineries Limited will spend about Rs. 720 crores during the Eighth Plan including the equity investment in the aromatics project. Addressing the 24th annual general meeting of the company, Mr. H. Krishnamurthy, chairman and managing director of MRL said that the ongoing projects will be financed with internal resources without budgetary support from the government.

He informed the members that the Rs. 168 crore lube expansion project recently cleared by the government would raise the production from the present 1.4 lakh tonnes to 2.7 lakh tonnes including 50,000 tonnes of bright-stock per year. Mr. Krishnamurthy was also happy to note the final approval for the giant aromatics project given by the Union government.

He said the project would produce two lakh tonnes of PTA, 30,000 tonnes of ortho xylene and 23,100 tonnes of benzene. It would also produce 1.36 lakh tonnes of para xylene for captive consumption. Following the memorandum of understanding MRL has reached with the ministry of petroleum, the company board has powers to clear new projects worth of Rs. 50 crores and upto Rs. 100 crores for renewals and replacements.

The chairman of MRL observed that the company's performance in the first half of the current year was extremely good. The company, he said had achieved the highest-ever profit before tax of Rs. 84.92 crores as against Rs. 61.04 crores in the previous year.

CSIR AWARDS

The Council of Scientific and Industrial Research (CSIR) on September 26 announced the names of ten scientists selected for the prestigious Shanti Swarup Bhatnagar prizes for the year 1989. The prize winners include Prof. S.C. Lakhotia of the Banaras Hindu University and Dr. Manju Ray of Jadavpur University for biological sciences and Dr. S. Chandrasekaran of the Indian Institute of Science and Dr. M.K. Chaudhari of the North Eastern Hill University for chemical sciences.

Dr. P.C. Pandey of the Space Applications Centre in Ahmedabad gets the prize in earth sciences, while Dr. G. Prasad of the Tata Institute of Fundamental Research gets it for his contributions in mathematical sciences. The others include Dr. S. Banerjee of the Bhabha Atomic Research Centre and Dr. G. Venkateswara Rao of the Vikram Sarabhai Space Centre for engineering sciences and Dr. M. Lakshmanan of the Bharathidasan University and Dr. N.V. Madhusudana of the Raman Research Institute for physical sciences.

Young scientists award for six

Six research scientists, all below 35, on September 26 received the CSIR Young Scientists award for 1990 for outstanding work in four branches of science and engineering.

The awardees in biological sciences are Dr. L.N. Misra of the Central Institute of Medicinal and Aromatics Plants and Dr. B.L. Tekwani of the Central Drug Research Institute of Lucknow. Dr. Mahipal Reddy of the Indian Institute of Chemical Technology in Pune received the chemical sciences award. Dr. V. Purnachandra Rao of the National Institute of Oceanography i Goa for earth sciences and Dr. H.C Kandpal of the National Physica Laboratory in New Delhi for physica sciences.

The awards consisting of Rs. 20,000 a momento and a citation were hande over by the Minister of State for Scienc and Technology, Prof. M.G.K. Menon at a function organised by CSIR in Ne Delhi.

ADB AID FOR STUDY ON NATURAL GAS

The Asian Development Ban (ADB) has approved a US $450,00 technical assistance grant for regiona study on increased utilisation of natura gas resources in India and nine othe countries. The main objective of th technical assistance is to conduct a stud to assess the potential for increased ga use in Bank's developing member countries (DMCs).

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Plastic units hit by hikes in raw material prices

Small plastic units have been hit by xorbitant increases in the prices of raw naterials. Mr. M.R. Gupta, president of he All India Federation of Plastic ndustries, said manufacturers have ncreased the prices of PVC resins by ix per cent and those of DBP by 46 per ent.

He said phthalic anhydride is an mportant ingredient for the production of DOP. DOP and DBP are used for nanufacturing PVC compound, which s a vital raw material for footwear. Thus, any increase in price of phthalic nhydride affects successive products, ne said. The price of phthalic anhydride n May was Rs. 26.62 per kg. It is curently ruling at Rs. 45 per kg. In addiion, the price rise for butanol and octanol has pushed up the rates of DOP and DBP. However, the prices of polystyrene, polypropylene, LDPE and HDPE have not changed.

Mr. Gupta urged the government to ake immediate steps to bring down the prices of raw materials and save the industry from imminent closure. The other problem is the steep hike in power tariff. Consequently, the economic condition of SSI units in Delhi has become critical. He further said that though the investment limit for small units had been raised up to Rs. 60 lakh, state governments refuse to register units upto this limit in the absence of a gazette notification. Mr. Gupta stated that the plastic processing industry has come a long way and is now using precision technology for the production of various items used in automobiles, engineering, construction, agriculture, electronics, packaging and footwear.

OSWAL PETROLEUM HIKES LDPE PRICE

Oswal Petrochemicals has raised the price of low density polyethylene (LDPE) to Rs. 36.50 a kg. exclusive of taxes. This is the second time in recent months that Oswal has increased its price following the firming up of global and Indian polymer market in the wake of the Gulf imbroglio. As the import pipeline has become increasingly drier, polymer price in the open market has touched record levels. High density polyethylene (HDPE) has touched Rs. 44 and polypropylene has crossed the Rs. 50 level. Some special grades are not available in the market and command even higher prices.

Except for Oswal, other Indian polymer producers like Indian Petrochemicals Corporation Ltd., Polyolefins Industries Ltd. and National Organic Chemical Industries Ltd. have not revised their prices. Indian nylon producers may be forced to peg up their prices in the coming months following the firming up of global caprolactam prices.

ROW OVER PSF PRICE INTENSIFIES

The controversy between spinners and polyester staple fibre (PSF) manufacturers over a reasonable price for PSF has intensified. The Indian Spinners Association (ISA) has alleged that PSF producers have formed a cartel and have hiked the price unreasonably to Rs. 77 per kg.

The Association of Polyester Staple Fibre Manufacturers (APSFM) has argued that the price of inputs (DMT/PTA and MEG), domestic and imported, have gone up considerably pushing the cost of PSF. "Updating the BICP fair price, taking into account the hike in inputs, the fair selling price for PSF would work out to Rs. 82.50 per kg. Moreover, the BICP fair price is based on 90 per cent capcity utilisation, whereas PSF industry is operating around 50 per cent of its installed capacity", claims APSFM.

ISA has also argued that the main contention of PSF manufacturers that they had to resort to the price hike of about Rs. 12 per kg because of the price rise in DMT/PTA sounds very hollow as the increase in DMT/PTA price is only Rs. 4 a kg.

PSF INDUSTRY JUSTIFIES PRICE HIKE

The polyester staple fibre (PSF) industry has rejected the allegation of the yarn spinning industry of hiking the PSF price through cartelisation. The Association of Polyester Staple Fibre Manufacturers (APSFM) in a press release has justified its price hike to Rs. 77 a kg stating that the price of domestic and imported inputs costs have gone up. Updating the BICP fair price, taking into account the hike in inputs, the fair selling price for PSF today would work out to Rs. 82.50.

Moreover, the BICP fair price itself is based on 90 per cent capacity utilisation, whereas the PSF industry is operating around 50 per cent of its installed capacity", it said. The industry is also experiencing difficulty as a result of uncertainty in the availability of PTA and DMT and the need to import PTA at a heavy premium against additional licence, it further added.

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Diamines & Chemicals' sales (including excise) has increased to Rs. 8.45 crores during April-August 1990 as against Rs. 5.95 crores during the corresponding period in 1989. Production of all amines have increased to 883 tonnes during the period, compared to 679 tonnes during the corresponding period of the previous year. The company has received government approval for increasing the capacity of ethylene amines up to 5,000 tonnes and of piperazine up to 300 tonnes. The company plans to achieve these capacities in a phased manner.

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Tamil Nadu alcohol based units in trouble

The Tamil Nadu Government's zest flooding the State with cheap liquor is likely to drown its alcohol-based industries. In need of a life-boat are as many as 50-odd units engaged in the manufacture of a variety of products including bulk chemical and pharmaceuticals.

According to industry sources, there has been a gradual, though undeclared, cut in the allotment of alcohol to the chemical units, most of them in the small and medium sector in the past six months. Since the Government came out with the move in March, the supply of alcohol to them has dwindled to just 30 per cent of what they drew last year.

The drastic cut in supply has come about with only two of the proposed 14 blending units in the State on stream. The Government being bent on ensuring the flow of cheap liquor from the remaining units also as scheduled by the end of the vear to achieve its ambitious target of filling its coffers by Rs. 500 crores, the alcohol-based industries dread to think of the future, if at all there is one.

The total production capacity of the eight distilleries in the State, including a couple of expansion projects under execution, is put at 1008 lakh litres a year. Out of the 50 alcohol-based units, only four Chemplast, Trichy Distilleries, Cordite factory in Ooty and Southern Hydrocarbons — are identified as bulk consumers with a combined offtake of 562 lakh litres. While the first two are captive units, Cordite is attached to the Defence department and Southern Hydrocarbons is in the joint sector.

In the unorganised sector are 40 units mostly involved in the manufacture of products like ethyl acetate, solvent ether, diethyl phthalate and perfume items. Their total requirement is put at 150 lakh litres. That means, the industry needs anywhere around 650 lakh litres to 700 lakh litres a year. Unofficial sources say that the cheap liquor project may require as much as 650 lakh litres of alcohol. This apart, IFMS will absorb nothing less than 100 lakh litres taking the total requirements of alcohol for potable use to a staggering 750 lakh litres.

In such a scenario of demand far exceeding the supply, the Government to start with, seems to be applying the brakes on the units in the unorganised sector.

For reasons only too obvious, the bulk consumers are not so vocal in voicing their problems. They maintain that as on date they have not been affected by the squeeze. All the same, they concede that the industry will face a shortage with the imminent spurt in demand from blending units. However, spokesmen of the small units, hit hard by the crisis say that Government officials have already told them in clear terms to look elsewhere for alcohol. In the first place, they contest the claim that distilleries in the State are operating to full capacity. Atleast a couple of them have shut down their plants for maintenance and others are operating only to 80 per cent capacity. In other words, the current alcohol availability is only 750 lakh litres, they contend.

Government sources, when contacted for details on the offtake of blending units and production at distilleries were reluctant to disclose them. ''Alcohol is a touchy subject and we are not obliged to speak to anybody'' runs the official refrain, as though to lend more credence to the industry's grievance reports.

Paradoxically, the Government gave an assurance early this year that it will reserve 70 per cent of alcohol produced in the State for industrial use. The ratio has now been reversed with the bulk of alcohol going for human consumption industry observers point out. If reports that the cheap liquor is not such a hit with the consumers are also to be believed, disturbing questions arise quite naturally on where all the alcohol is flowing.

Another major grievance of the industry is the poor implementation of the ethyl alcohol price control order. Although the price per bulk litre of alcohol supplied to industries is fixed at Rs. 2.50 the market price is anywhere between Rs. 4.50 and Rs. 6.00. This problem is not peculiar to Tamil Nadu alone, but prevails in all surplus States like Maharastra, Uttar Pradesh and Gujarat.

In Tamil Nadu, the price of rectified spirit supplied to cheap liquor units is fixed at Rs. 3.75 per bulk litre. The distilleries are quite unhappy with the arrangement as they claim that production cost comes to Rs. 4.00 per litre. At present, the Government buys alcohol at Rs. 3.75 per bulk litre. From every litre of alcohol, it is stated that 2.5 litres of arrack can be obtained. With the price of a 100 ml cheap liquor sachet fixed at Rs. 4.50, the cost per litre comes to Rs. 45 per litre. In effect, the returns from the investment of Rs. 3.75 is a mindboggling Rs. 110 or so and the Government should pay them atleast Rs. 5 per litre, distillery owners feel.

Should the government succeed in implementing its cheap liquor project, chemical units starved of alcohol supplies have very limited options before them to survive. The question of knocking at Maharashtras door, which was open until two months ago is also ruled out with that State Government imposing a ban on alcohol movement. Uttar Pradesh also cannot spare any alcohol with the entry of more chemical units there. Even otherwise, surplus States do not take kindly to the idea of diverting their reserves to industries elsewhere. The only way out will be to go in for imports as in 1985 when the Central and State Governments waived excise duty and taxes. But with the alcohol prices looking up in the international market now, it is no longer a viable proposition.

Decks cleared for GSFC plant

ith the Technical Evaluation mmittee (TEC) of the Centre giving reen signal, decks have been cleared Gujarat State Fertiliser Company d.'s (GSFC's) Rs. 500 crores capro- tam plant proposed to be set up with iss, Polish and West German tech- logy.

The plant, with a rated capacity of ,000 tonnes per annum (TPA) will volve an expenditure of Rs. 100 ores in foreign exchange. The GSFC's oposal is expected to be put before the reign Investment Board for approval me time next month.

Official sources do not expect any oblem in getting a nod from the board ough the country is facing a foreign xchange crunch. With the proposed lant becoming operational, the coun- y is expected to become self-sufficient caprolactam.

A caprolactam project has two parts. In the first, the basic raw material, benzene, is used to produce an intermediatory product called anone. GSFC is understood to have decided to go in for Swiss and Polish technology for this part of the project. Anone is then processed by a separate plant to produce caprolactam. According to informed sources, the company had decided to buy the required technology from BASF of West Germany.

At present, against an estimated demand of one lakh tonnes for caprolactam, GSFC's plant (the only one in the country) produces about 20,000 TPA. To meet the balance, imports of about Rs. 200 crores are undertaken every year.

In addition to the one pending decision with the government, GSFC is already setting up a plant with an installed capacity of 50,000 TPA. It is expected to be completed by March 1992.

In addition to this, Fertiliser and Chemicals Travancore Cochin Ltd. (FACT) is also setting up a plant to produce 50,000 TPA of caprolactam. The project launched about six years back is already behind schedule by over three years and is now expected to be completed early next year.

MORE UREA DEMANDED

Agro input dealers' association has urged prime minister V.P. Singh to immediately arrange for additional allotment of 20,000 m.t. of urea for the standing kharif crop in West Bengal.

The association has pointed that Indo-Gulf Fertiliser has ready stock of urea in the state, but the stock is earmarked for the coming rabi season.

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PHARMACEUTICAL PRICING

BICP flays dept's 'fault finding'

The Bureau of Industrial Costs & Prices (BICP) has charged the Department of Chemicals and Petrochemicals with adopting a "fault-finding approach" in its calculations on pharmaceutical pricing.

In a strongly-worded letter addressed to Mr. M.S. Gill, BICP chairman, Dr. Vijay Kelkar, has noted that "this is a disturbing trend which is also highly demoralising for the concerned professionals working on drugs/formulations in BICP".

Extracts from the letter are revealing. The letter invites Mr. Gill's attention to the letter dated, July 23, 1990 on the price of ephedrine HCl from Mr. Vinod Vaish, Joint Secretary (Pharmaceuticals) to S.N. Chattopadhyay, member (finance).

The letter says: "The enclosed note will make it patent that certain allegations of discrepancies in the BICP's report on ephedrine HCl have been made without justification on the basis of premises/assumptions which are either wrong or not relevant at all. There appears to be a tendency to quote figures/findings not appearing in the relevant BICP report and then ask BICP to reconcile the position or to have a fresh look at the basis of calculations, etc. This is a disturbing trend which is also highly demoralising for the concerned professionals working on drugs/formulations in BICP. In the particular case of ephedrine HCl, there is no case for any revision of the findings and recommendations already communicated to your department in our report of January 1990."

Dr. Kelkar adds: "This is not the first case where such informed queries have been raised in relation to BICP reports on bulk drugs. In the case of benzathine penicillin, the question of 'test checking' the BICP calculations was mooted. In this connection, the DO letter No. 5/20/89-BICP dated June 18, 1990, from Shri S.N. Chattopadhyay, member (finance) to Mr. Vinod Vaish, JS (PI) is referred to. A point was also earlier made and repeated in the DO letter under reference that BICP should give the basis of arriving at the actual costs or estimated costs along with reasons for such basis. This point was replied to in BICP's letter No. 5/2/88-BICP dated May 8, 1990. In yet another communication, your department raised the question of discrepancies between the draft report and the final report and asked BICP to reconcile/explain the position. This was also adequately replied to.

"All such queries reflect a fault-finding approach without the evidence of having any adequate understanding of the cost and technical analysis done in the BICP drug reports. These queries are leading to considerable amount of infructuous work in the BICP, and frankly, this is not desirable.

"I thought I should bring all these issues to your personal attention so that the honourable minister (petroleum and chemicals) does not remain uninformed of the spread of analysis and the basis of recommendations contained in BICP reports, as also of the fact that the queries raised against the BICP lack adequate analysis and appreciation. This is specially considered necessary since some of the communications from your department state that the instructions have the minister's approval."

GENETIC SCIENCES GRANTED LICENCE TO IMPORT VIALS OF ANTI-CANCER DRUG

Genetic Sciences India Private Limited, headed by Mr. M.G. Prakash, son of Petroleum and Chemicals Minister, Mr. M.S. Gurupadaswamy, will make a profit of Rs. 27 lakh from the licence granted by the government to import 9,000 vials of human alpha interferon injection, according to industry sources.

The injection, a life-saving anti-cancer drug, enjoys total duty exemption. The government also allows two per cent handling charges for the vials imported at a cost of Rs. 54 lakh CIF. As per drug price control order, the importer can charge a mark-up of 50 per cent on the drug.

The injection is a specialised anti-cancer injection that is not normally available off the shelf, according to industry sources. Such speciality drugs are seldom imported for stock and sale. Imports are normally resorted to by actual users, namely cancer hospitals and clinics.

It is highly unlikely that the Bangalore firm headed by Mr. Prakash would import such a large quantity of the injection without tying-up with hospitals in advance, sources said. Needless to say, most of the hospitals where the drug would be used will be government hospitals. Human alpha interferon is not a drug available off the shelf in the international market either.

Though DPCO permits only a 50 per cent mark-up, retailers sell the injection at much bigger margins because of the shortage of the drug and the nature of the disease. The nature of the deal suggests that the company has already tied-up with the actual users (hospitals) before applying for the import licence. The licence was granted by the government in a record time of 15 days, according to government sources.

The imports will be sourced from National Geno Sciences Inc., a company headquarters in Michigan, USA. One of the directors of Genetic Sciences India Pvt. Ltd. is also based in the same American city. The company was incorporated in August 1985 with a subscribed capital of Rs. 4,000. Thereafter, the equity was raised to Rs. 96,000.

Burroughs draws up plan to beat drug price control

Burroughs Wellcome (India) Ltd. has wn up a three-pronged strategy to t the price control imposed by the ion petroleum and chemicals minis-

Burroughs Wellcome has decided to ersify into the area of fine chemicals, e greater emphasis on exports and roduce more new products in the arket. Disclosing this to reporters at ombay on Sept. 21, immediately after e annual general meeting of the comny, Mr. D.K. Bose, managing direcr and president, said that the company s decided to manufacture "certain emical substances which have strong nergy with its existing line of products nd technology".

Mr. Bose made it abundantly clear at any diversification by the company ould be "outside the price control catgory". Considering the fact that over 0 per cent of the company's products re under price control, Burroughs Vellcome's move to diversify is logial and inevitable.

Mr. Bose, however, would not reveal ll his cards. Asked to specify his diverification plans, he merely said that his ompany was in the process of identiying products in certain select areas. He lso disclosed that the company was lanning a large chemicals project.

The company has already appointed onsultants for the project, he said, vithout disclosing either the cost of the roject or the product being made. He inted at the possibility of Burroughs Vellcome setting up a separate comany for the proposed project.

Burroughs Wellcome has also lecided to give more emphasis on xports. In view of the unremunerative eturns in the domestic market, caused mainly by the rigid price control the stress on exports is only to be expected. "We have decided to break into the export market", he said. The company would initiate steps to develop new export markets for products and services.

In this context, Mr. Bose pointed out that the company has received good enquiries from the Soviet Union. Exports of Burroughs Wellcome amounted to Rs. 38.57 lakh for the year ended March 1990. On f.o.b. basis, exports were just Rs. 4.48 lakh in the previous accounting year. Besides tax incentives, export products do not fall within the ambit of price control.

HINDUSTAN ORGANIC CHEMICALS

Hindustan Organic Chemicals Ltd. recorded an increase in production, sales and profits during the last annual year. Addressing the annual general meeting, the Director incharge Mr. V.K. Aundhe, observed that while production had risen to 2,06,383 tonnes, the sales turnover had shot up to Rs. 205.05 crores. Mr. Aundhe said that the operating profit before depreciation and interest for the year went up to Rs. 59.22 crores and the net profit after depreciation and interest touched an all-time high of Rs. 35.83 crores.

The company proposed to take up some other projects, which includes the setting up of new plants for the existing products like nitrobenzene, aniline, hydrogen, monochlorobenzene, and nitrochlorobenzene at a total cost of Rs. 69 crores. The execution of a new formaldehyde project at Rs. 10 crores is also in the offing. With a view to enable pollution control, the company has commissioned a full scale biodegradation plant at a cost of Rs. 1.4 crores for remvoal of residual toxicity from the pretreated effluents.

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OPPI - AGM

Loan Licence System to go by end-1991

The Union Minister for Petroleum and Chemicals, Shri M.S. Gurupadaswamy has categorically stated that the loan licencing system will not be extended beyond December 1991. Speaking at the twenty fourth Annual General Meeting of the Organisation of Pharmaceutical Producers of India (OPPI), Mr. Gurupadaswamy noted that the loan licence system had resulted in a decline in the quality of drugs available in the market and that it is the opinion of most officials in the regulatory bodies that the system be discontinued.

The pharmaceutical industry which makes about 20% of its products through this universally accepted system, is expected to oppose the move.

The Annual General Meering (AGM) was followed by a seminar on "Quality Assurance & Rational Drug Therapy".

WELCOME ADDRESS

Dr. S. Agarwala, President, OPPI

Welcoming the chief guest, Mr. M.S. Gurupadaswamy, the OPPI President, Dr. S. Agarwala, noted that the pharmaceutical industry in the country, shared the objectives of the government -- to develop the pharmaceutical industry into an efficient, dynamic, fast-developing enterprise committed to the larger national goal of meeting the growing need for high quality medicines at reasonable prices. Assessing the industry scenario, Dr. Agarwala noted that production of bulk drugs stood at Rs. 610 crores and that of formulations at Rs. 3,360 crores, in the terminal year of the 7th Five Year Plan. "Remarkable though the increase has been, it is still below the 7th Plan target", making it the second time in a row that plan targets were not achieved, said Dr. Agarwala. Attributing this to the dismal pricing scene in the country he noted that while the costs of inputs, utilities and services continued to rise, the cost of imports had also gone up substantially largely due to the declining value of the rupee vis-a-vis other currencies. "All price revision applications, including those cleared by the Bureau of Industrial Costs and Prices (BICP), were kept on hold since October 1989, with the result that prices remained frozen till the close of the year".

The cumulative effect of rising costs and frozen prices was that margins which were already low, declined to uneconomic levels. A survey of 23 companies accounting for about one-third of total sales of pharmaceuticals in the country showed that pre-tax profits in the domestic pharma business was a mere 3.21% of sales in 1989-90, as against 3.36% in 1988-89 and 2.35% in 1987-88, whereas a pretax profit of 8-13% was permitted in the DPCO, 1987. As a result domestic business had to be subsidised by exports and non-pharma business. If this trend continues, Mr. Agarwala felt that most pharma companies will be forced to diversify into non-priority areas for survival.

Automatic price revisions

Considering the administrative burden associated with clearing a large number price revision applications pending with the government, Dr. Agarwala felt that the only practical alternative was a two pronged approach involving: automatic adjustment of prices based on indexation of cost within the parameters laid down by the Government, and progressive decontrol, leaving only medicines required for the national health programmes under the ambit of price control. "To ensure that no company makes excessive profits, a ceiling on profitability may be specified", he said. With the industry operating under a highly competitive environment, decontrol would result in prices coming down.

Drug Prices Equalisation Account (DPEA)

Commenting on the recent claims made by the Government on the Drugs Prices Equalisation Account (DPEA), Mr. Agarwala noted that no company had refused to pay legitimate dues.

"In fact, several companies had already made payments into the DPEA to prove their bonafides in this regards. All that they are asking is

-- in determining the the amounts payable, the entire period of the DPEA, namely 1979-87, and not a part of it, should be taken into account

-- 'unintended profit' should be set-off against 'unintended losses', if any, and only the balance, whether profit or loss should be taken into account".

If the Government takes the stand that no set-offs will be permitted, "companies will be left with no option but to seek legal redress as a last resort," Mr. Agarwala said.

Poor R & D efforts

Pointing out that the current R & D expenditure of the Indian pharmaceutical industry at 1.5% of sales, was deplorably low, as compared to a world-wide average of around 10%, Mr. Agarwala offered two reasons for this poor effort viz. the small size of the industry and its poor profitability.

"Other reasons for the poor state of R & D remains the government's reluctance to permit the expenditure on research as an element of cost in pri-

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cing of drugs, and the high imposts levied on imported scientific equipment and instruments.

"All that the industry can afford considering its size and profitability is 'development' research -- to develop new processes of manufacture, improving the efficiency of existing processes and technologies, identify and develop local substitutes for imported raw materials, evolve improved formulations etc."

Subsidised medicines for the poor

Reiterating that the costs of medicines was a small percentage of total cost of medical care in the country, Dr. Agarwala added that even a 25% or 50% reduction in the cost of medicines is not likely to make medicines affordable to the poor.

"The Government's objective of making available essential medicines for the poor can be achieved by subsidising or giving free medicines under the national health programmes. The industry has in the past offered medicines for such programmes at low cost. It stands by this commitment and is willing to make its contribution to solving this national problem", Dr. Agarwala said.

Framework for growth

To ensure the vitality of this industry, Dr. Agarwala stressed the need for urgent remedial action on the following points:

- stability and continuity of Government policies
- ensuring adequate returns, to provide a sufficient fund for R & D ploughback.
- progressive decontrol with the ultimate aim of complete decontrol of prices
- no major change in categorisation of drugs

ADDRESS OF CHIEF GUEST M.S. GURUPADASWAMY

At the very beginning of his address Mr. M.S. Gurupadaswamy, Union Minister for Petroleum and Chemicals, categorically denied that his ministry had appointed a 3-membered committee to study the list of Category I drugs, with a view to modifying the lists.

However, the minister was less emphatic in denying whether the Ministry of Health was contemplating such a move. "Categorisation of drugs comes under the purview of my ministry, and it is very unlikely that another ministry would have set up such a committee", the minister said.

Commending the Indian pharmaceutical industry, the Minister noted that the industry had grown in stature, to be able to produce 65% of bulk drugs required in the country. "This gives India a special position in the third world", he said.

He called upon the industry to rise to the occasion of meeting increased levels of consumption of medicines, concomittant to a rapidly rising population and rising standards of living of the people. "Greater effort needs to be made in producing drugs from basic stages, using indigenous raw materials, and not from a penultimate stage, using imported raw materials", the minister added.

Pragmatic policy on pricing

While emphasising that the Government was not contemplating any new drug policy, Mr. Gurupadaswamy, affirmed that an ongoing review of drugs was necessary to ensure achievement of Government objectives. "We are keen on a pragmatic policy for pricing, ensuring ready availability of drugs as well as adequate returns on investments to the industry", the minister noted.

The minister urged the industry to rationalise the production of formula tion, weeding out irrational combina tions, thus bringing down the tota number of formulations available.

OTC drugs under generic names

Decrying the proliferation of brand even for simple drugs such as parace amol, the minister called upon th industry to investigate the possibility c introducing generic names for suc over-the-counter (OTC) drugs.

Additional incentives for exports

Commending the industry for a goo export performance, particularly t developed countries, Mr. Gurupadas wamy announced plans for additiona incentives for exports. Pressed fo details, however, the minister decline to give additional details.

In conclusion, the minister urged th industry to ensure rigid quality contro and observe good manufacturing prac tices. "Industry must exercise sel restraint and discipline to achieving th objectives of providing quality drugs, a reasonable prices and in abundant quan tity", the minister said.

OPEN SESSION

The minister's address was followe by an open-house session, where th minister faced a barrage of question pertaining largely to matters of pricin and policies. Mr. Vinod Vaish, Joi Secretary, Ministry of Petroleum an Chemicals, fielded most of the ques tions on behalf of the minister.

Inaugurating the session, Dr. Aga wala, commented that certain anoma ies cropped up particularly with regar to incentives given for developing a ne drug indigenously. This results in single product being made by variou manufacturers at different levels of co and profitability. The minister howeve noted in reply that this benefit to a innovator was very much

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industry itself as a reward for indigenous R & D. The anomaly in pricing was an off-shoot of such encouragement being given for innovative work. However, Mr. Gurupadaswamy noted that todate only 7 or 8 people have benefitted from the Government's scheme to keep drugs developed through the process of indigenous R & D out of the purview of price control.

Responding to another view that frequent representations in Parliament, only resulted in inclusion of more drugs under price control, the minister replied that while numerous drugs are being looked into, not all of them will be brought under price control.

Admitting that packaging norms require a realistic revision, Mr. Vaish, admitted that such discussions were on at the moment.

At the end of the Open-Session, Mr. D.K. Bose, Vice-President, OPPI, proposed a vote of thanks.

SCENTIFIC SEMINAR ON QUALITY CONTROL & RATIONAL DRUG THERAPY

The inaugural session was followed by a scientific seminar, on "Quality Assurance & Rational Drug Therapy". Welcoming the delegates to the seminar, Dr. K. Kalyan, in his inaugural address noted that this was the first time that such a seminar, combining two vital themes was held by the association. "While Quality Control is the responsibility largely of the manufacturer, rational therapy, is a responsibility of the Doctor, and it is the synergistic combination of these two, that benefits the patients", said, Dr. Kalyan.

With modern medicines becoming increasingly potent, the role of rational methods of usage cannot be overemphasised, felt Dr. Kalyan. However, he felt, that on the subject of combination drugs the press had largely overplayed the risks associated with using such drugs. "Nowadays excellent formulation technology permits manufacture combination drugs on scientific rationale, and many such combinations are well known".

Dr. Kalyan however admitted that in certain instances, combinations were conjured up with only the financial advantages in mind, and that such acts were deplorable. Rational drug therapy extends well beyond the manufacturer, Dr. Kalyan felt, adding that the government, the industry, the doctor, the chemist and the various consumer groups combined together to make for rational therapy.

In his address, Mr. A.K. Mago, Commissioner, FDA, Maharashtra, stressed the vital importance of the subjects of quality control and rational drug therapy. He noted that the recent Drugs and Cosmetics Act, had in its' Schedule M, codified the procedures for achieving good manufacturing practices (GMP). "This is essential for building up of the confidence of the consumer", Mr. Mago said.

The first paper on Quality Assurance, was presented by Mr. G.K. Nair, General Manager, Q & A, Glaxo India Ltd. Through an interesting presentation of slides, Mr. Nair contrasted the procedures being followed by a manufacture following GMP, and another operatin through a gala in an industrial estate. H posed the questions: Is price parity o a product prepared by GMP norms an non-GMP norms fair? With obviou disparity in costs of production, wha kind of incentive are we offering a manufacturer for following GMP?

"The net result of the present polic is that any manufacturer giving a quality product is doing so at the expens of profitability", Mr. Nair felt.

Mr. Nair, proposed a radical solutio to the problem of price parity among unequals: gradation of factories with higher graded units given higher norms for conversion. "If such gradation ca be followed for eating houses, why not for pharmaceutical units," asked Mr. Nair. The scheme would reward a manufacturer following GMP norms, while ensuring that the customer can be assured that he would be getting a better product albeit at a higher price.

In the second paper titled "Quality Assurance: whose responsibility", Mr. Devinder Pal, President, Indian Pharmaceutical Association (IPA), highlighted the limitations associated with quality control, by way of analysis. Only GMP can ensure good quality on a consistent basis, avoiding costly rejections and recalls. While in this sense, GMP was a "cheap" option vis-a-vis rejects, recalls, etc. maintenance of these norms evidently cost money. Mr. Pal also highlighted the role played by pharmacists in ensuring the correct dispensation of medicines to the consumer.

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Raw material pricing affecting utilisation of plastics

With prices of plastics both in the ternational and domestic markets rming up sharply offtake of plastic roducts have not picked up, seriously ffecting the plastic processing units in e country, according to Shri Vijay V. erchant, President, All India Plastics anufacturers Association. Mr. Merhant made these observations while ddressing the Annual General Meeting f his association in Bombay on Sepember 21.

Though there has been fluctuations in he international polymer prices, the rocessors have not got relief, as the ollar has kept hardening every month, o some extent offsetting the polymer rice fall that was seen in last quarter of 1989, said Mr. Merchant. "The Government policy of higher naphtha pricing for petrochemical units and the 30% plus excise on resins and protection to the indigenous polymer manufacturers for over three decades by steep import duty (on imported polymers), has seriously limited wider applications of plastics in our country. Other developing nations with more sensible levies, have achieved speedier growth and advancement with several mass application uses of plastics. It is hoped now the wisemen at the Centre will not experiment with any further upward duty revisions whether it be for PVC, HDPE, Styrene or LDPE as the cascading effects of taxes and duties are considerable. It will be more prudent to assist polymer producers to rapidly expand, let them go for world scale plants with better technlogies, greater energy efficiency and reduce their cost of polymers produced", said Mr. Merchant.

Long-term policy essential

With seven and a half lakh tonnes consumption of virgin polymers the revenue to the Government in 1989-90 as reported in budget was Rs. 1,466 crores. (Rs. 1,040 crores Customs and Rs. 426 crores Excise). With projected consumption of 17 lakh tonnes in 1994-95, the revenue from the plastics industry would be nearly Rs. 2,500/-crores. Apart from the increased revenue to the exchequer, the increase in tonnage by processing will yield considerable benefits in villages, towns and cities, helping generate more income and employment, besides accelerating industrial growth, technical advancement and supporting environmental protection and ecological balance. "It is therefore imperative that the Government should lose no time in evolving a long term policy on price and availability of raw materials for the plastics processing industry. Only with stable price and free availability can the processing industry really have continuous growth and plan ahead safely, according to Mr. Merchant.

Indigenous production to increase

It is expected that the indigenous production of polymers should show a quantum jump in this year (1990/91) once M.G.C.C. (Nagothane) goes into full production. India, however, will continue to import a sizeable quantity of polymers in the coming years, as several areas of application remain to be exploited and our per capita consumption compared to both our neighbours in South East Asia and the rest of the world is very very low, below even the one kg per head level. The delays is comissioning the Reliance Plant at Hazira and the expansion of NOCIL plant at Thane are most concerning, according to Mr. Merchant, as project delays inevitably mean cost over runs, higher capital costs, which in turn get reflected ultimately in higher product pricing in our country. Polymers produced at plants with a higher investment cost, will mean that the country will be paying much more for the polymers, affecting their end uses. "In a developing economy the cost of raw materials determines the areas of substitution from traditional to new sources, and higher costs also restrict the pace of change and development considerably," noted Mr. Merchant.

The uncertainties, even today, in proposed projects of Haldia, Gandhar, Visakhapatnam and Auraiya are worrying signs for the plastic industry and the country in the long run. "If we do not build up capacities today, as a nation of almost 850 million people in 1990/91, our industrial development, growth in the agriculture sector, besides upliftment in the standard of living of the masses will be seriously affected.

"New ventures in Engineering plastics in India are welcome signs -- PIL is moving ahead with Acetal copolymers and IPCL with support from G.E. in polycarbonates, both of which should help costly metal replacements and support automotive and engineering sector advancements".

Exports -- New initiatives required

Although as an industry plastics have shown a jump in exports from Rs. 128 crores to Rs. 170 crores in the last year, very few units pursue exports in a serious manner in India. Small units in particular in India shy away from exports due to inordinate delays in receiving drawbacks, CCS and duty free licences and the burdens of documentations which are frustrating. Mr. Merchant felt that if the large polymer companies were to takeup the responsibilities of ensuring plastic product exports as a small percentage of their polymer output in value and take 40/50 units each with capabilities, under their fold and nurse them, reaching exports of Rs. 400 to Rs. 500 crores in less than 2 years would become quite feasible. "The marketing skills, administrative abilities, infrastructure and reach of the polymer companies could be well utilised for a very important national cause", Mr. Merchant said.

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Natural gas saves Rs. 1,875 crore

The increased use of natural gas for replacing other petroleum products has helped bring about an estimated Rs. 1,875 crores savings in foreign exchange to the country in the last financial year, a spokesman of the Oil and Natural Gas Commission (ONGC) has claimed. On the other hand, the ONGC's total contributions to the national exchequer in the form of dividend royalty and other levies during the same period was Rs. 4,396 crores.

The spokesman said ONGC's latest strategy for putting the oil and gas fields on early production system had also helped the country in saving another Rs. 350 crores per annum. The innovative system requires ONGC to go for production as soon as hydrocarbon deposits are struck without waiting for infrastructural facilities. The ONGC had so far put 44 fields on such a system.

On the side of exploration strategy, the ONGC is now keen to add far more to its reserves than the depletion resulting in a steady increase in the recoverable reserves. The balance recoverable reserves of crude as in January this year, had been estimated at 1,297.82 million tonnes as against 859.73 million tonnes estimated five years ago.

Encouraged by the results from its exploration strategy, ONGC had also decided to increase crude production in the country in the current plan period by about 53 million tonnes more than the production in the Seventh Plan, while the production of natural gas was expected to go up by about 200 per cent during the same period.

It was concentrating on helping the domestic industry as much as possible. The ONGC had now placed an order for equipment supply to the domestic sector worth over Rs. 5,500 crores which would be about 50 per cent of its requirements as against 20 per cent supply from the domestic industry in the beginning of the Seventh Plan.

The spokesman said due to ONGC's efforts, the southern region of the country had been put on the oil map with 24 new oil and gas discoveries made in the Krishna-Godavari and Cauvery Basins since 1980. All the newly-discovered wells had been put on production through the early production systems. Besides, Tripura had also been upgraded as producing basin.

On the international scenario, ONGC's value of foreign business including exploration contracts in other countries, prospect evaluation, and consultancy in training services was worth more than $28 million. The spokesman said ONGC's Institute of Management Development (IMD) was planning to internationalise its activities on a big scale. It was developing training programmes tailor-made to suit the requirements of developing countries in specialised areas of the petroleum sector. It has already given expert counselling and training to countries like Vietnam, Uganda, the United Republic of Yemen, Sudan and Zambia, in diverse areas ranging from petroleum geology, marketing management, environment management, well-logging and other sectors.

Earlier, it had also training executives from Ghana, the Soviet Union and some other countries in the fields of exploration management and well logging. The institute was developing linkages with other international institutes in the United Kingdom, France and some other countries to co-operate in formulating the training programmes.

The IMD organised about 300 training programmes every year involving nearly 4,000 executives from India and abroad for upgrading their skills and updating knowledge to keep them abreast of the latest developments in technology.

With human resources development through training and retraining identified by the ONGC as one of the key areas, the IMD through its four staff training institutes in Bombay, Baroda, Sibsagar and Rajahmundry is providing a special thrust to non-executive training to enable them to develop their skills to be ready to shoulder executive responsibilities in future, the spokesman said.

UNIPLAS INDIA TIE-UP WITH BRITISH GAS

British Gas, one of the world's largest companies has agreed to transfer the latest technology and expertise on polyethylene gas distribution pipes alongwith distribution system know-how to Uniplas India Limited.

An MoU between the companies was signed on September 11, which includes the financial participation in the Indian company. Mr. Bakshi, Chairman of Uniplas said that with this agreement, subject to approvals from the Indian Government and company shareholders, British Gas PLC-UK will take up five per cent stake in the enhanced equity capital of the company.

He said that this opens up an important field for the company in view of the Government announcement made recently for priority plans being evolved for the utilisation of natural gas for various uses in the country. Over Rs. 2,500 crores worth of gas is presently being flared up. The Government has plans to utilise this huge energy source as early as possible. Gas distribution for various uses including industry and household, in a very big way, is on the anvil in India, he said. Further, he informed that feasibility surveys in metropolitan cities like Bombay, Delhi and Kanpur have already been completed.

This collaboration will boost the activities of the company and position it in a unique position in the plastic industry, Mr. Bakshi stated. A senior executive of the British Gas will join the board of directors of Uniplas he added.

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Gujarat plans Rs. 2,000-crore petroleum refinery

Gujarat is planning to set up a 100 per cent export-oriented petroleum refinery involving an investment of Rs. 2,000 crores at Wadinar in Jamnagar district. A proposal for this has already been submitted to the Union Government.

Speaking at a meeting organised by the Indian Merchants Chamber (IMC) at Bombay on September 25, Mr. Chimanbhai Patel, Chief Minister of Gujarat, said the State was keen to have private sector participation in the proposed petroleum refinery.

If the Union Government was willing to allow private sector participation, then this project could be set up in the joint sector, he pointed out.

The Chief Minister said during the Eighth Plan, the State will lay more emphasis on gas-based power stations, and coal will not be used for generating power. It had submitted proposals to the Union Government for setting up 615 mw each gas-based power stations at Gandhar and Pipavav, and 1000 mw at Sihor. A separate company — Gujarat Power Corporation Ltd., had been formed to implement new power generation projects.

The State will require additional 1,965 mw power during the Eighth Plan. At present, the installed capacity is around 4,823 mw.

Mr. Patel said gas worth Rs. 800 crores was flared up in Gujarat every year and the Oil and Natural Gas Commission (ONGC) found it unviable to use this gas. The State Government had submitted a proposal to the Union Government to set up a number of small power stations using this flared up gas with private sector participation.

He flayed ONGC for charging high rates for gas supplied to Gujarat whereas Assam was charged lower rates. Calling for a national fuel policy, he said there was no need to transport coal from Bihar and elsewhere to meet the State's requirements, and transport gas available in Gujarat to other northern States.

He hoped that the Narmada project would be ready by 1994-95, and it was being executed speedily. Maharashtra had allocated 2,700 hectares of land to rehabilitate Narmada oustees, he added.

Mr. Patel observed that Gujarat had formulated a special scheme for rehabilitation of sick units. Funds earmarked to revive sick units will enjoy benefits of sales tax deferment, he added. The State Government had provided 35 per cent subsidy for setting up small units in backward areas, and enhanced benefit of sales tax for low capital and employment-oriented industries.

Under the new industrial policy, the State had classified 140 taluks as backward, out of a total of 180 taluks. The State will soon finalise rehabilitation packages for 11 sick textile units and it is also keen to develop mineral based industries.

In his welcome address, Mr. Mahendra K. Sanghi, President of IMC, was of the view that Gujarat Government should take up the issue of freight equalisation for coal with the Centre. He urged the State to emulate Andhra Pradesh, Maharashtra and Rajasthan in offering new gas-based power projects to the private sector.

The State Government should vigorously pursue with the Centre its demand for providing gas at a cheaper rate to industries. He favoured setting up of an industrial estate in the backward Dharampur taluk of the State.

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ASSAM REFINERY

PIB clearance soon

Clearance from the Public Investment Board (PIB) for the Assam accord refinery is expected shortly. ''Pre-PIB clearance involving various ministries and preliminary environmental clearance having been obtained, we are hopeful of getting the approval of PIB within the next two to three weeks'', according to Mr. A.A. Niazi, chairman and managing director of IBP Co. Ltd., the state-owned undertaking under the petroleum ministry promoting the refinery jointly with the Assam government. Mr. Niazi was talking to **The Economic Times** at the company's annual general meeting at Calcutta.

Although a public sector company, IBP has public holding of 23 per cent. Financial institutions hold 17 per cent of the equity, the balance 60 per cent being held in the name of the President. The IBP chairman estimated the cost of the proposed refinery at Rs. 1,200 crores against the original estimate of less than Rs. 1,000 crores. ''However, a clearer picture will emerge after the PIB clearance'', he said.

The debt-equity ratio for the project has been fixed at 4:1, with IBP holding a 51 per cent equity stake in the company yet to be formed. While the participation of IBP in the projects is firm the same is not true about that of others. The equity participation of the Assam government through the Assam Industrial Development Corporation, the stake of financial institutions, if any, and the size of the public holding, have not crystallised yet. ''The participation of the Assam government will be finalised'', Mr. Niazi pointed out, ''after the MoU with the state government has been signed and the new company formed''.

IBP, its chairman emphasised, wa going ahead with the work of the proposed refinery. The company, it migh be recalled, used to run two refinerie in Burma in pre-independence days. I the Eighth Plan, IBP proposes to inves about Rs. 850 crores in various project ''However, much will depend on ho much the government finally allocate to the company'', said Mr. Niazi. ''W have indicated to the government tha we can finance up to 50 per cent to th proposed investment from our interna resources.''

The thrust of the future investmen programme would be on the oil sector Under the new supply arrangement by the Union government, IBP is no longe the consignment agent of Indian Oi Corporation. Instead, it has bee accorded the status of a full-fledged marketing company for petroleum products. This has necessitated the installation of storage tanks and distribution points and LPG plants throughout the country.

In conformity with the government's additional product tankage programme, there are proposals to set up storage tanks each at a cost of about Rs. 25 crores at Mathura, Allahabad and Lucknow in Uttar Pradesh, Muzzafarpur in Bihar and Cherlapalli in Andhra Pradesh in the Eighth Plan period. Of these, the Mathura project has already been commissioned. Baroda in Gujarat and Lakwa in the Assam are probable locations identified for LPG plants each estimated at Rs. 150 to Rs. 200 crores.

The company's plan reveals that the proposal for compressed natural gas (CNG) involving marketing of CNG as a substitute fuel for conventional petrol-driven vehicles is under consideration of the government and the decision in this regard for a project in Tripura is pending. The proposed marketing terminal to be set up by the company for evacuation of petroleum products from the distillation column at the Cauvery basin under construction by

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dras Refineries Limited (MRL) is pected to provide the requisite fillip he company's marketing activities as on as the MoU is executed with MRL. ere is a further 50,000 tonnes at Vashi ar Bombay.

While the operation of the lube oil rrel filling plant at Shakurbasti near lhi continued satisfactorily during the ar, the lube oil blending plant at udge Budge, Calcutta, commenced ll-scale production about a year ago.

The company's engineering division oposes to set up petrol/diesel dispensg units in collaboration with Schwelm anksysteme GmbH of West Germany r which government clearance has een obtained. The erection of the comany's titanium nitride coating plant at asik for development of decorative oating has been completed.

At the meeting, Mr. Niazi indicated hat the company might be required to xplore various avenues and take resort o new financial instruments to raise esources to finance future investment rogrammes, including the Assam ccord refinery. He did not rule out the ossibility of the company making a ights issue in future. However, he efrained from commenting firmly on he shareholders demand. Shareholders lso attended the annual general meetng. This became possible after the ecent rights issue when the employees, nder the Employees Stock Option ssue. The shareholders ratified resoluions relating to the payment of 22 per ent dividend on equity shares and 14 per cent on preference shares as recommended by the board of directors.

The company maintained its trend of profitability during 1989-90. Turnover amounted to Rs. 995.53 crores against Rs. 923.02 crores in the previous year. Actual profits before tax during the year would have been Rs. 8.05 crores but for the provisions which had to be made in regard to revised pay-scale of executives as per the government decision. Effective management reduced the tax rate to 16 per cent against 23 per cent in the previous year. Net worth stood at Rs. 66.22 crores at the end of 1989-90 against Rs. 43.71 crores at the end of the previous year.

LAC BRINGS IN LESS FOREX

Foreign exchange earnings from lac declined from Rs. 19.08 crores in 1988-89 to Rs. 17.76 crores in 1989-90, according to the Chairman of the Shellac Export Promotion Council, Mr. J.P. Kanoria. Addressing the 33rd annual general meeting of the council, Mr. Kanoria said that while 7,170 million tonnes of lac was exported in 1988-89, in the following year exports came down to 6,200 million tonnes.

Hoping that new food habits would help lac find a very important place for itself in the international market, Mr. Kanoria said that research studies in India and abroad have shown that the non-toxic nature of lac could make it useful in areas like packaging and colouring of food items.

Mr. Kanoria said that the emergence of developing countries as important buyers of Indian lac was a significant development. He was hopeful that pollution consciousness and urge for natural resin would help India regain the markets of the industrialised countries.

At this juncture, he said that there was a need for popularising the versatility of lac in a more determined way and also to strengthen the instruments that are looking after the production.

IPCL DIRECTOR

Mr. Trivedi has been appointed Director (operations) of Indian Petrochemicals Corporation Ltd. (IPCL), Baroda. He was IPCL's Executive Director (Baroda complex) prior to this appointment.

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Unique features in ONGC MoU with Ministry

A memorandum of understanding (MoU) was signed at New Delhi on September 21 for 1990-91 between the Oil and Natural Gas Commission (ONGC) and the Ministry of Petroleum and Chemicals. The MoU was signed by Dr. Madhav Godbole, Secretary, Department of Petroleum and Natural Gas, Ministry of Petroleum and Chemicals and Mr. S.L. Khosla, Chairman, ONGC.

The MoU for 1990-91 includes certain unique features incorporated for the first time. These are delegation of full powers for foreign exchange releases to ONGC, 'enhanced powers for incurring expenditure on new investments, replacements and renewal of assets, inclusion of dynamic effect parameters like planning, R & D and training in the performance evaluation of the MoU and the special emphasis given to the project.

The MoU spells out in detail the targets to be achieved by ONGC in respect of ITU exploration, drilling, production and financial performance. The target for crude production is 33 million tonnes up from the target of 61 million tonnes in 1989-90. The target for gas supplies is 9920 million cubic metres against the target of 8636 million cubic metres for 1989-90. Similarly, the LPG production target has been increased from 700 thousand tonnes last year to 725 thousand tonnes.

Some of the new projects for submission for investment approvals include the development of L-11 and L-111 reservoir of Bombay High, additional pipeline from South Bassein to Hazira (first stage), development of Ravva field and Usar oil and gas terminal and pipelines (first stage). The MoU also indicates the time frame for
clearance of foreign exchange proposa
within ONGC. As in the past year, t
Commission would mobilise resourc
for its capital requirement through inte
nal surplus, suppliers credit, market bo
rowings etc. and would not draw ar
budgetary support from the Gover
ment.

The MoU confers full powers c
ONGC for foreign exchange releas
within its approved budget. The pow
to incur expenditure on additions, mod
fications and new investments has bee
raised from the existing limit of Rs. 2
crores to Rs. 50 crores without the pric
approval of the Government, the powe
to incur expentiture on replacement an
renewal of assets has been increase
from Rs. 50 crores to Rs. 100 crores. I
return, the Government has committe
that the various investment proposals c
the Commission would be cleared b
the Project Investment Board within 9
days of the receipt of the feasibilit
report.

The Government has also agreed t
consider reimbursing the additional co
burden to the Commission incurred du
to exchange losses on foreign borrow
ings, extra expenditure on account c
price preference to indigenous partie
and loss of interest on public depos
accounts as compared to commercia
lending rate. The Government has als
assured the Commission that it woul
assist it in recovering dues from the va
ious State Governments and othe
public sector undertakings. It would als
assist the Commission in obtainin
environmental clearance within a perio
of 30 days of the submission of the rapi
environmental appraisal report.

The MoU will be reviewed on
six-monthly basis by the Government a
well as the Commission, according t
an official release. Meanwhile, a hig
powered committee set up by the Gov
ernment for evaluating MoUs has com
plimented the Commission fo
incorporating innovative features in th
MoU for the current year.

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Mangalore Chemicals sale to UB group

The state government has managed to
et approval of the Controller of Cap-
al Issues (CCI), for the sale of the con-
olling stake in Mangalore Chemicals
nd Fertilisers Ltd. (MCF) to the UB
roup, according to informed sources.
n the past few weeks, resistance has
een building up against the govern-
nent's decision to privatise this ailing
oint sector undertaking.

The finance ministry as well as the
CI have apparently raised some objec-
ions. But senior officials of the state
ndustries department went to Delhi, and
ccording to informed sources, managed
o get the CCI's consent to the proposed
ale.

The decision of the finance ministry
s not known as yet. Despite obtaining
CCI's clearance, an early breakthough
to the impasse is not on the cards. Mr.
Veerendra Patil has been pushed onto
the defensive, in the recent past by the onslaught launched against the sale of MCF to UB group by the state Janata Dal president Mr. J.H. Patel and Mr. H.T. Reddy, former Congress(I) MLC.

The latter wants the government to invite open-bids from renowned industrialists, in case, the Centre does not want to take over the ailing company. His objections basically centre around the contention that the government is giving UB group control over a company worth Rs. 400 crores for a mere investment of Rs. 25 crores to Rs. 30 crores, to be made by UB group.

The state government had taken a decision to accept the UB group offer to buy 24 per cent of the 34.3 per cent equity held by the state government in early May, this year. But the decision was kept under wraps because, the financial institutions and banks, which control about 20 per cent of MCF's equity, had not yet given their approval. In July, this year, Mr. Mallya announced that the financial institutions had given their approval to the UB offer.

But now, it looks as if UB will have to wait for some more time for the deal to come through.

CAPROLACTAM UNIT OF FACT TO BE READY BY DEC.

The Rs. 376 crore ammonium sulphate caprolactam project of Fertilisers and Chemicals Travancore (FACT), near Kochi, will begin commercial production by December this year. The cyclohexane and cyclohexanone plants of the project were commissioned earlier this year to produce anone, the principal intermediate for the manufacture of caprolactam. The lactam flaking and bagging sections have been tested and become fully operational, Mr. S.M. Jain, acting chairman and managing director of FACT, said at the annual general meeting of the company.

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GSFC asked to import argon gas

The Union Government has asked the Gujarat State Fertilisers Company Ltd. (GSFC) to arrange for the import of 2.50 lakh cubic meters of argon gas following reports that work on several important projects, including the ones being set-up by Nuclear Power Corporation, has come to a halt owing to its shortage in the country.

According to official sources, the argon gas production during the current year is expected to be 30 lakh cubic meters against an estimated demand of 40 lakh cubic meters.

The Centre has decided to meet only a part of the shortfall because of the difficult foreign exchange problem facing the country.

Reports reaching the Centre suggest that against the official price of Rs. 170 per cubic meter, the gas is being sold in the market for about Rs. 200 per cubic meter.

GSFC has been asked to organise argon imports in view of the fact that the company manufactures about 24 lakh cubic meters of gas every year i.e. 80 per cent of the total production in the country.

The rest of the output is contributed by about half a dozen small manufacturers. Since the gas evaporates fast, specified containers are needed for its transportation.

Argon is recovered by GSFC from the purge gases of ammonia plants as a by-product. The company has three ammonia plants with a combined rated capacity of 3.48 lakh tonnes per annum. GSFC's expansion plan for manufacturing additional 4.40 lakh tonnes of ammonia is under execution.

It is felt that after the additional ammonia manufacturing capacity goes into operation, the country will be nearly self-sufficient in argon gas. Among its numerous applications, argon is used for creating inert atmosphere in the manufacture of rare and semi-rare metals which are used to set up nuclear plants.

The gas is also used for the welding and cutting of aluminium, stainless steel, titanium etc. and is also of immense importance in aircraft and missile industries.

RCF AMMONIA PLANT DEDICATED

A Rs. 65-crore-ammonia rehabilitation plant of the Rashtriya Chemicals and Fertilisers Ltd. (RCF) was dedicated to the nation by the Union Minister of State for Rural Development, Mr. Upendra Nath Verma.

Speaking on the occasion, Mr. Verma said just as we had achieved self-sufficiency in foodgrains after independence, we should also be self-sufficient, in fertiliser production. The country required 116 lakh tonnes of fertiliser per year and 35 lakh tonnes had to be imported, he added.

RCF had made a profit of Rs. 69 crores during the year. The Minister said the ammonia plant, prior to its rehabilitation, was not producing to its full rated capacity as it was an old one. The government granted approval for revamping the old plant to keep pace with technological developments elsewhere in the world, he said.

The project had been completed without any time or cost overruns. The total capital invested was about Rs. 65 crores, with a foreign exchange component of Rs. 6 crores.

The salient features of the rehabilitated plant include reduction in energy consumption by about 35 per cent and cost of production by about Rs. 900 per tonne of ammonia.

The Indian fertiliser industry ranked fourth in the world with respect to nitrogenous fertilisers and eighth with respect to phosphatic fertilisers, involving a total investment of about Rs. 5,000 crores, he added. Mr. Bhagey Gobadhan, Union Minister of State for Planning and Programme Implementation, who presided over the function, stated there was too much wastage in the public sector.

If five per cent of the wastage was avoided, Rs. 8,000 crores could be saved per year, he said, adding that these additional resources could be used for some other purpose or for reenergising sick units.

IDLE OIL RIGS, RS. 300 CRORE INVESTMENT IN JEOPARDY

Investment to the tune of Rs. 300 crore by oil and gas-drilling companies in the services sector are in jeopardy due to a sudden reduction in business opportunities offered by the major oil companies in the country.

Presently, there is a 30 per cent idle capacity in offshore rigs which is 40 per cent in the case of onshore rigs, according to an estimate of the confederation of engineering industry (CEI).

The situation is expected to deteriorate with the reported pruning of the industry. According to CEI, the industry employs more than 3,000 persons and has performed excellently during the past three years, saving more than Rs. 100 crore in foreign exchange.

The oil and gas sector being highly capital intensive, the payments for assets is spread over 10 years for which the contractor needs continuous business during the repayment period. The loss would result in a net foreign exchange outflow. Notwithstanding the large existing idle rig capacity in the country, ONGC was planning to continue procurement through domestic resources.

More import of nitrogenous fertilisers on the cards

India will soon have to resort to nport of nitrogenous fertiliser, which vill involve a cost of around Rs. 700 rores.

Importantly, a large chunk of this dditional burden will have to be borne n hard currency, as most of the East European countries are proposing to greatly reduce or eliminate rupee payment arrangements with India and sell their surplus fertilisers for hard currency.

According to projections made by the Minerals and Metals Trading Corporation (MMTC), the annual deficit in nitrogenous fertilisers is expected to range between one and 1.2 million tonnes during the next five years. According to estimates, while demand for this fertiliser is expected to go up from 7.8 million tonnes in 1990-91 to 9.9 million tonnes in 1994-95, production will go up from seven million tonnes to 8.9 million tonnes during the period.

Projections show that deficits of phosphatic fertiliser is expected to remain in a narrow band of 0.5 to 0.8 million tonnes per year during the coming five years. Demand in 1990-91 will be 3.2 million tonnes, which will go up to four million tonnes by 1994-95, while production is expected to move up from 2.6 million tonnes to 3.2 million tonnes in the period.

But it is pertinent to note that most of this fertiliser produced in the country is based on imported rock phosphate and sulphur or phosphoric acid as raw materials.

The deficit projected reflects the import requirements of phosphatic fertiliser only and those of raw materials required for producing it locally. The shortage of potash-based fertiliser is expected to be around 1.2 million tonnes in 1990-91 which is to go up to 1.6 million tonnes by 1994-95.

The MMTC has made demand-supply estimates up to the year 2000. By that time nitrogenous fertiliser shortfall will be 4.3 million tonnes, demand being at 13.2 million tonnes while production will lack behind at 8.9 million tonnes. According to this estimate, there is unlikely to be any fresh addition tc the production from 1993-94.

Phosphatic fertiliser deficit will alsc go up — to 2.2 million tonnes by the year 2000. Here again, production is expected to be static from 1993-94 onwards. The gap for potash-based fertilisers is expected to be in the range o 2.1 million tonnes at the end of the decade.

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Workshop on "Safe Handling of chlorine for consumers"

A full day workshop on "Safe Handling of Chlorine for Consumers" was organised by Standard Alkali, Chemicals Division Inspectorate Dept. Maharashtra and Dept. of Explosives Govt of India on September 5, 1990 at Mafatlal Kalyan Kendra Sabha Griha, Prabhadevi, Bombay - 400 025.

Mr. K.S. Baroi, Secretary (Labour & Employment), Government of Maharashtra delivered the key note address and inaugurated the workshop. The workshop was attended by 200 persons and had a good representation from Factory Inspectorate Department, Standard Alkali's chlorine consumers & agents and others. Well documented technical papers were presented by the experts during the workshop followed by screening of a video film on chlorine disaster management and on the spot demonstration of the use of emergency kit for stopping the chlorine leakage from the container and cylinder.

Mr. Baroi while inaugurating the workshop stressed the need for great care to be exercised not only in the production of chlorine but also in the subsequent handling, transportation and consuming activities. Mr. Baroi was very happy that for the first time such a workshop of a practical nature in collaboration with the authorities has been organised by a producer and complimented Mr. V. Ramadurai for taking the lead and wished that similar workshops would be organised in future by the producers of other hazardous chemicals.

Mr. Baroi also stressed the need for education of drivers, who transport chlorine in trucks. He also narrated chlorine leakage at CCI swimming pool. The situation was somehow handled with great difficulty and many persons inhaled chlorine gas. Similar situation at small consumers end need proper guidance and training to the consumers. Dr. Mukherji, Chief Controller of Explosives stressed the need for taking care of chlorine cylinders and containers while handling and assured the gathering that difficulties experienced by the producer or the consumer in adhering to the rules laid down by the Explosives Department can always be discussed with his department.

He also said that since the transport by trucks of hazardous chemicals is being resorted to throughout the country, there is a need for a quick clearance of the trucks on a priority basis in the octroi naka without having to wait for their turn and probably creating a potential hazard. The department would do a 100 per cent check up if an inspection of all cylinders at the manufacturing stage could be looked into to create better safety during manufacture.

Mr. Mirashi, Chief Inspector of Factories, Maharashtra advocated the use of suitable alternates like bleaching powder, tablets, etc. especially in areas like water chlorination, where chlorine usage can be avoided.

Mr. Mirashi also referred to the safety culture that has to be developed for making sure that the chlorine is handled with proper care. Mr. Mirashi also cited a number of cases from his experience about the emergency situations arising out of chlorine leakages and how to tackle them. He also indicated that proper type of tools and accessories should be used.

Plastic tubes are used by small consumers, which become hard during the course of usage and cause accidents. Inverted U loops are not provided by the consumers, as per the recommendation of the supplier to prevent water or process liquid sucking back into the container.

He agreed to assist in the implementation of good practices in handling of chlorine as Department of Explosives is not having adequate staff. The participants made the technical session more lively by asking many questions.

The proceedings of the workshop was summed up and concluded by Mr. V. Ramadurai with the following additional remarks:

— The chlorine installation should be thoroughly checked and approved by authorities regarding safety measures before commissioning.

— The need for national policy on chlorine transportation may be looked into. The following can be the salient points:

— Chlorine should not be transported for more than a distance of 200-250 km. by a producer.

— Mutual-aid scheme to be formulated by utilising the fire stations at different locations equipped to handle such chlorine emergencies.

— Chlorine trucks should not be stopped at octroi naka.

— There should be green belt around 2 km. area from chlorine producer plants.

— Education of truck drivers as all safety precautions taken by producers and consumers can be nullified by a driver.

— The chlorine producer should not always be held responsible for a leakage at consumer end and during transportation.

— There is a need for granting education and persuation of small consumers.

— Chlorine should be made a high value product so that consumers are careful during handling and reduce wastage and are mentally prepared to spend the money required for safety.

He concluded the workshop by thanking all the persons, who contributed for making the workshop a great success, with special reference to coordinator of the workshop Shri A.K. Rohatgi for conducting the workshop.

'Environmental clearance of projects must be statutory'

ve voluntary groups have urged the
ernment to reject the dilutions pro-
d in environmental clearance to
strial and mining projects, and
re an ecologically sustainable
lopment strategy.

he Government should make envi-
nental clearances to development
ects statutory and legally binding in
r to fulfil its commitment, promised
s poll manifesto and the Eighth Plan
oach paper, to an ecologically and
ally sensitive development process,
groups have demanded.

alpavriksh — Environmental
ion Group, Multiple Action
earch Group, National Campaign
Housing Rights, Intach and Lokayan
gested in a press release formulation
n integrated development policy for
country incorporating industrial,
icultural, housing and energy goals
hin an ecologically sustainable and
ially equitable framework.

But, they said, the proposed indu-
al, agricultural and housing policies
the Government and the energy pri-
ties so far followed are a continua-
n of the ecologically and socially
ensitive policies followed earlier.
his is despite the promise of a dras-
reorientation in the draft approach
per for the Eighth Plan''.

The groups have also urged the gov-
ment to reconsider the ''Serious eco-
ical and urban bias implications'' of
Delhi master plan, and modify it to
rmonise with the Centre's own stress
decentralised development and
generation of the rural resource base.

The growth of Delhi as envisaged in
new master plan will place great
ess on the natural resources of rural
eas as far away as Jammu and Kash-
r. ''These areas will be squeezed
ough new dams, power stations and

other projects to provide the capital with water and electricity they say. Again, despite a poll manifesto promise to stress small and medium irrigation projects, mega-projects like Narmada and Tehri continue to receive active support from the government, the groups say.

The only positive contribution of the National Front Government, they say, has been at the level of the approach paper of the 8th Plan which gives importance to environmental issues. ''But this paper still does not present a vision of a development process which is ecologically sustainable and socially equitable'', they say. And in any case, they say, ''what use is an approach paper which is constantly and grossly violated by the actual programmes and projects of the Governments?''.

INDUSTRIAL EFFLUENTS POSE THREAT TO HEALTH

Industrial effluents containing heavy metals like iron, lead and cadmium are polluting ground water and posing serious health hazard to people living around industrial areas in the country.

This has been borne out in a recent study, by the Department of Geology of Benaras Hindu University, on the effect of the presence of heavy metals in drinking water in the Naini industrial area of Uttar Pradesh's Allahabad district.

The study said, ''lead affects formation of haemoglobin and bone marrow and replaces calcium in bones while cadmium interferes with certain enzymes and causes hypertension and cancer of liver and lungs. The hydrogeochemical study which tested water samples taken from wells some 50 to 100 kms away from the various industries which dot the area, said the cause of pollution were the effluents from these industries.

According to the study, lead content in well water near some of the industrial units in Naini was found about seven to nine times of the maximum permissible limit (0.1 milligram per litre) in drinking water, fixed by the Indian Standard Institution in 1983.

The other most hazardous substance, cadmium was also found to be five to eight times of the maximum permissible limit of 0.01 milligram per litre. The value of iron, another heavy metal, in wells near some of the industries was above the highest desirable limit of 0.3 milligram per litre, the study said, adding that iron content rendered the well water unsuitable for use as potable water.

LIMESTONE FIND IN JAISALMER

The inhospitable desert district of Jaisalmer, is fast emerging as an important centre on the industrial map of the country, thanks to the huge deposits of limestone found in the sandy terrain.

Within three years of initiating mining in the region by the Rajasthan State Mining Development Corporation, Jaisalmer has started attracting big industrialists and mining experts from all over the country. Large limestone deposits have been located at Sonu on the Jaisalmer-Ramgarh road, about 55 km from Jaisalmer town.

About 2.83 crore tonnes of limestone deposits have so far been estimated. Of this, 74.42 lakh tonnes of deposits contain steel grade mineral while, the remaining deposits have chemical and cement grade stuff, official sources said.

The Corporation is mining about 1,500 tonnes of limestone daily, providing employment to about 2,000 persons directly and indirectly. Plans are also afoot to send Sonu's steel grade limestone to Vishakapatanam and other steel plants.

Maharasthra pollution control board flayed

The Maharashtra government and the Pollution Control Board have failed to take action against many polluting industries, according to Mr. M.C. Mehta, noted environmentalist and Mr. Vidyadhar Gokhale, MP.

Speaking to newsmen after visiting Chembur, Antop Hill, Thane, Belapur and some other areas, where chemical industries are located, they said even the recommendations of the Garg committee on safety aspects had not been implemented properly.

"A single major accident due to negligence, human error, terrorist activity or technical failure would wipe out thousands of people living in nearby areas" they said.

"Bombay is sick and dying today" because of alleged failure of the state government to control pollution and non-implementation of policies on environment and industrial location, they said.

Some of the big industries were allowed to increase their manufacturing capacity under the pretext of expansion and modernisation, ignoring all environmental considerations and safety aspects, they said.

While setting up nuclear power stations and hazardous industries, an assessment should be made in advance to know it's impact on environment and public opinion be sought on this, they added. They also stressed the need for setting up of environment courts in the country, as at present courts were not in a position to decide environment-related cases promptly.

TAMIL NADU TO SET UP WASTE DISPOSAL PLANT

The government of Tamil Nadu has finalised the site for a common haz waste disposal plant at Chengai An District. This plant is to come up i 100-150 acre plot of land for treati hazardous solid waste from the che ical and tanning industries in the distr

This project will be the first in country and also the first in the ser of the Tamil Nadu Pollution Cont Board's projects which place responsibility for waste disposal on pollutors rather than on an outsi agency. The project will be executed a company set up for the purpo whose share-holders will be those whi are polluting the area. There will be o such project for each district in the sta said Mr. P.M.Belliappa, chairman of state pollution control board. They w be set as a joint effort by the industri located in that district, by subscribi to the share capital of the company be formed for the purpose.

Mr. Belliappa was speaking at inaugural function of a one-day sem nar organised by the Confederation Engineering Industry (CEI) southe region and the Tamil Nadu Polluti Control Board (TNPCB) on emergi areas in pollution control. Mr. M. Rajendran, chief secretary to the go ernment of Tamil Nadu said in his ina gural address that it was not on industrial growth that was needed, b growth combined with a pollution fr environment.

ATMA'S PLEA TO PUT SYNTH TIC RUBBER UNDER OGL

The Automotive Tyre Manufacture Association (ATMA) has urged government to place synthetic rubb under Open General Licence (OGL) counter the "monopoly" of Synthe & Chemicals Ltd. U.P., which h raised prices by 17 per cent in the l six months. According to ATMA, company has taken advantage of monopoly and raised the price of sy thetic rubber by 42 per cent over thr years.

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Prosecution against Grasim stayed

ıe Karnataka high court has stayed ecution proceedings initiated ıst Grasim Industries by the state ıtion Control Board. The stay was ted on September 21 in response to it petition from the company chal-ing the board's move.

ıe board had filed a criminal com-ıt against Grasim Industries for vio-g the Water Act. According to it the ples of effluents discharged from the pany's unit at Harihar had not met out of the 16 parameters stipulated he board.

ddressing the newsmen at Banga- on 26 Sept. Mr. Shailendra K. Jain, ior Executive President, Grasim ustries Ltd. said that the state board's on was arbitrary. According to him prosecution move was against the y objectives of the Water Act.

Mr. Jain said that the combined effluents of Grasilene Division and its sister concern Harihar Polyfibres met all limits prescribed by the board and the river water quality after mixing of the effluents was also well within the limits set by the board as per their own monitoring.

He felt that the board's demand that each of the two units individually meet the effluent standards set was unreasonable. According to Mr. Jain the present practice of stipulating concentration based standards uniformly to all industries was technically unsound. Waste load per ton of product manufactured he felt would be a better criterion for regulating pollution from the effluents discharged.

The action initiated by the board according to Mr. Jain was indicative of the 'technical and administrative weaknesses' that had crept into the board during the last few months.

MAKING PROFIT OUT OF HAZARDOUS WASTE

Disposing of hazardous wastes can be a profitable business according to Dr. Kenneth William Hladun, chairman of Omega Thermal Technologies Inc., and Omega Industrial Group, USA. Addressing members of the Confederation of Engineering Industries at Bangalore on 25 Sept. he said that the market for know-how and equipment for safe disposal of waste was growing phenomenally in all the industrialised countries. Dr. Hladun gave details of a range of equipment developed by his company, which is one of the largest in the waste disposal business worldwide. According to him it was possible to convert the most diverse range of wastes into useful products. A system designed and installed in several parts of the US by Omega produces solidified briquettes and metal ingots out of waste to be used for making concrete and asphalt.

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MOVEMENT OF HAZARDOUS CHEMICALS

Need for specific norms

The international community must set specific principles and guidelines for monitoring and controlling transnational movement of hazardous substances, chief of a United Nations body had suggested.

At a conference at New Delhi "some priority issues of environmental protection", Mr. Azam Fazlul Hoque, chief water, environment and marine affairs section of the UN Economic Commission for Africa said that transboundary air and water pollution can be a global problem.

He said in recent times there were reports of even insidious dumping of hazardous wastes by one country in the off shore areas of another. Similarly, hazardous chemicals and other similar substance can be exported from one country to another and acid rain, resulting from uncontrolled emissions from industries in one country can affect the people, property and natural resources in another, he said.

Mr. Hoque said nearly five million chemicals have been synthesised in the last 40 years in the world at the rate of some 10,000 new ones every month. Some 50,000 to 70,000 chemcials are used in millions of different commercial products, he added.

Mr. Hoque pointed out that these chemicals include extremely toxic substances which can cause allergies, damage organs, cause or promote cancer in quantities as small as parts per billion or a few drops in a big-size swimming pool. Citing figures relating to India, Mr. Hoque said India uses nearly one lakh tonnes of pesticides annually. India's chemical industry, with some 4,000 factories, produce highly to wastes and in most cases their dispo methods are far from satisfactory.

Mr. Hoque highlighted certain ma agement, organisational and leg aspects for safe disposal of hazardo substances. Mr. Hoque said manag ment should be made solely responsib for safe operation of their installation all times. He identified some of the rol of management as follows:

— Identify hazardous installation and provide adequate information abo thier location and operations to the loca state and national authorities.

— Carry out hazard assessment in a such installations and report to th appropriate authorities.

— Set up emergency and contingency plans to deal with accidents an other contingencies.

Mr. Hoque said the role of local, stat and national authorities was to prepar an inventory of hazardous installation with as much information as possibl about their location, operation and management capabilities and periodi inspection of such installations. On th legal aspects, the expert said legislation must be enacted at the national level fo proper management and disposal o hazardous substances. Secondly, ther should not be any conflict between th global protocols and conventions, th national and state laws and municipa by-laws.

Mr. Hoque said global, national stat and local organisations should eac have their roles and responsibilitie clearly defined in order to avoid situations of conflict and duplication o efforts. He also stressed on the need fo organising volunteer teams, trained an equipped in line with fire brigades a community and district levels to tackl emergency situations. Moreover, he sai national campaigns and information dissemination in creating public awarenes about the risk to health and environment in dealing with hazardous substances should be conducted.

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Company Notes

KOLMAK CHEM SETTING UP FERRO-CHROME UNIT IN MP

Calcutta-based technocrat C.S. Jalan of Kolmak Chemicals is setting up a 15,000 tonne per annum unit for manufacture of high-carbon ferro-chrome at Raigarh in Madhya Pradesh. Ferro-chrome is the most essential input in the manufacture of stainless and all types of alloy steels. Mr. Jalan, who has just taken over Bowreah Cotton from the L.N. Bangur group, said the unit, Standard Chrome, will cost Rs. 11.5 crore.

Tata Steel is keen to participate in the project's equity capital though the extent of its stake is yet to be decided. It will also supply the unit its basic raw material — chrome ore — from Tisco's Orissa mines for conversion into ferro-chrome.

The Rs. 11.5 crore project will have an equity component of Rs. 3.75 crore and get institutional loans of Rs. 7.6 crore and state subsidy of Rs. 10 lakh. The major institutional lender is the Industrial Development Bank of India.

Mr. Jalan said, Tisco and its associate companies were expected to take up a large chunk of the equity of Standard Chrome. The plant will cost about 40 per cent less than similar projects elsewhere because the technology and most of the equipment are indigenous.

The letter of intent for the unit does not describe Standard Chrome as an export-oriented unit, but the company, Mr. Jalan said, would route most of its exports through Tisco, which would pay a charge for conversion of its chrome ore into ferro-chrome.

The project may well come up in two phases with the second taking up production of other ferro-alloys like ferro-silicon, ferro-manganese and silico-manganese. The unit, Mr. Jalan said, would have the flexibility to switch over to production of other ferro-alloys.

Mr. Jalan said, Tisco's major chrome ore mines are in Orissa and it exports a large part of the ore. With the ore getting converted into ferro-chrome, there will be substantial value-addition. This, however, is not the first time Tisco has supplied ore to the Orissa-based export-oriented company Indian Charge Chrome as well but since Standard Chrome is not an EOU, it will be able to sell both in the domestic and the international market.

Local prices are around Rs. 18,000 a tonne, Mr. Jalan pointed out, compared to net export realisation by Indian units at the rate of Rs. 13,500 a tonne. The internal demand for it is above 100,000 tonnes which means Standard Chrome could command a fairly large domestic market.

ASIAN PAINTS RAISING STAKE IN PENTASIA

Asian Paints (India) Ltd. is increasing its stake in Pentasia Chemicals Ltd. from the present 24.9 per cent to 50.9 per cent. This is being facilitated by the decision of the Tamil Nadu Industrial Development Corporation Ltd. (TIDCO) to disinvest its 26 per cent holding in Pentasia. TIDCO and Asian Paints Ltd. are co-promoters of the joint sector chemicals unit.

In terms of the joint sector agreement, TIDCO has reportedly approached Asian Paints with the first offer of sale of its holding in Pentasia. TIDCO has offered Pentasia shares at around Rs.25 per share and Asian Paints has agreed to purchase the block of shares on that basis.

According to Bombay Stock Exchange sources, Asian Paints has, in conformity with the new guidelines, notified the exchange its intention to pick up Pentasia shares now being offered by TIDCO. Currently, Pentasia shares are quoted on the Bombay Stock Exchange at Rs. 43 per share.

With the acquisition of the 26 per cent stake held by TIDCO, Pentasia will become a subsidiary of Asian Paints. According to sources, this will help Asian Paints to pump in funds and free Pentasia of all outstanding loans and interest payments in the long run. For the year ending March 31, 1990, Pentasia reported a net loss of Rs. 1.01 crores. Pentasia has total loans amounting to Rs. 15.5 crores against a paid-up capital of Rs. 7.35 crores as at the end of March 31, 1990.

According to sources, it will easily take two to three years before Pentasia can turn the corner. Overcapacity, it is pointed out, is the bane of the industry. Presently, the industry has a total installed capacity of 12,900 tonnes of pentaerythritol against the demand of 7,500 tonnes per annum which is being shared by as many as seven units including Aegis Chemicals Ltd. and Kanoria Chemicals Ltd.

Pentasia itself has a capacity of producing 3,000 tonnes of pentaerythritol, most of the which is being consumed by Asian Paints. During the year under review, Pentasia exported some 222 tonnes of pentaerythritol of an f.o.b. value of about Rs. 64 lakhs.

Recently, addressing shareholders, the chairman of Pentasia had pointed out that during April to August 1990, the company produced 1079 tonnes of pentaerythritol and 465 tonnes of sodium formate, the capacity utilisation being 86 per cent.

According to the Chairman of Pentasia during the year under review there have been major increases in costs on account of power tariff which was hiked by 24 per cent from April 1989, followed by a hike in the price of caustic soda lye by 19 per cent. However, owing to overcapacity, selling prices could not be correspondingly altered to keep pace with higher costs of inputs and utilities. During the first five months of the current year, the company exported Rs. 15 lakh worth of products and it expects to maintain the tempo. The Chairman, however, noted that owing to a crash in the international prices of methanol, export prices of mono pentaerythritol too fell which made such exports quite unremunerative.

INDU-NISSAN OXO CHEMICAL PLANS FACELIFT

Indu-Nissan Oxo Chemical Industries Ltd. has undertaken technology upgradtion and modernisation of its existing manufacturing facilities. The project is expected to be commissioned by October-end this year.

The directors of the company have maintained six per cent dividend on equity on enlarged capital following 'rights issue' in 1989-90. The company has shown gross profits of Rs. 5.61 crores on the sale of Rs. 29.04 crores for 12 months as against gross profit of Rs. 6.55 crores on the sale of Rs. 33.23 crores in the 15 months of the previous years.

Addressing the annual general meeting of the company at Baroda, the Chairman, Mr. D.C. Gami, said that the sales during the first five months of the current year were about Rs. 14.54 crores as compared with Rs. 6.74 crores during the same period last year i.e. an increase of about 116 per cent.

After expansion, it is planned to achieve the minimum production of 10,000 to 12,000 mt by April 30 which should result in turnover of over Rs. 45 crores for the year against approximately Rs. 24 crores for the previous year. In view of Gulf crisis the raw material prices are likely to rise but simultaneously imports of alcohols will not be encouraged in view of sharp increase in prices of alcohols too. Part benefit of expansion would be realised in this year's working. However, from April 1991 onwards there should be no look back of our company, he added.

GUJARAT NARMADA FERTILISER COMPANY

The Gujarat Valley Fertiliser Company Ltd. (GNFC) has proposed a dividend of 8 per cent for the year ending March 31, 1990.

The company during the year under review has registered a gross profit of Rs. 55 crores. It has not provided for arrears of depreciation for the year 1988-89 amounting to Rs. 26.32 crores because it has represented against revision in the retention price scheme (RPS) enforced by the government which resulted in a lower rate of depreciation.

According to the company the major changes in RPS — enhancing capacity utilisation norms for fuel oil based plants to 85 per cent against 80 per cent and the plant life increased to 20 years (recently modified to 15 years) for calculation of depreciation — has affected company's results for 1988-89 and 1989-90.

As against depreciation rate of 6.33 per cent corresponding to 15 years of plant life GNFC is allowed only 3.83 per cent arrived at by dividing balance of depreciation divided by balance number of years. Effectively this amounted to only 3.83 per cent of depreciation admissible for calculation of retention price from April one, 1988. Consequently the financial results of the company has suffered despite the fact that the production performance had been more than 100 per cent.

A spokesman of the company said if GNFC's representation is accepted and depreciation is allowed at the rate of 6.33 per cent on plant and machinery instead of the lower rate, the company's gross profit will increase by about Rs. 28.77 crores and this will be accounted for in the current year's results.

14% STAKE IN HICO PRODUCTS FOR APTES

The Aptes have acquired about 14 pe cent stake in Hico Products Ltd. a Bombay-based company manufacturin chemicals. The Aptes have interest i sugar and textiles. The Aptes hav bought the stake in Hico from the Choksis of Asian Paints. The Choksis had initially acquired about 15 per cent interes in Hico over a year ago from the Abhyankars, one of the promoters of th company. They augmented their stak to around 18 per cent by additional purchases of Hico shares from the market

The Choksis are said to have sol their entire stake in Hico and given u their fight with the Dhamankars, th other promoter of Hico, for the contro of the company. Of the Choksis holding, about 14 per cent has been acquire by the Aptes and the balance of abou four per cent by the Dhamankars an their associates. The Choksis are understood to have realised good prices fo their Hico holding against their averag purchase price of about Rs. 38 per shar (Rs. 10 paid-up) and the current marke price of Rs. 28.

Mr. M.L. Apte, the head of the Apt group, is already on the board of Hic Products. It is likely that the representation of the Aptes on the board woul be augmented in due course. The Dhamankars and their associates now hol about 31 per cent of the company' equity of Rs. 3.30 crores. The financi institutions hold about 18 per cen whereas the balance of about 39 per cen is held by the investing public.

Hico suffered a setback during th year ended March 31,1990, with it gross sales amounting to Rs. 49 cror as against Rs. 61 crores in the previou 15 months. The company incurred a los of Rs. 2.06 crores for 1989-90, and th directors have proposed to skip the dividend for the year.

Easier import-export norms demanded

There is a crying need to simplify import-export laws, to reduce superfluous documentation.

Speaking at an annual general meeting of the All-India Importers' Association, the chief guest, Mr. Mahendra Sanghi said that a drastic surgery to reduce the plethora of rules and regulations governing foreign trade has assumed significance in view of the critical balance of payments situation. He called for rationalisation of direct and indirect tax structures so as to minimise the need for numerous incentives and disincentives to exporters and importers.

Mr. Sanghi lamented that the lack of co-ordination among the Ministries of Finance, Commerce, and Industry resulted in a continued tussle among them to gain their own ends by restricting imports of components, capital goods and raw materials. He mooted setting up of an institutional machinery for importers to mitigate the difficulties faced by them at various bureaucratic and other levels, similar to export promotion and commodity boards for exporters.

In his keynote address, Mr. Dilip Thakore a former journalist, said that unnecessary documentation was hampering exports. Giving an example, he said that in one case of deemed exports, 84 documents had to be filled up. He pointed out that foreign trade policy was loaded with discretionary powers almost to the level of the low-level clerk.

Listing out solutions to problems faced by the exporters, Mr. Thakore said that onus on exporters to satisfy various regulatory bodies should be done away with. He called for a drastic reduction in rules and regulations governing foreign trade. He favoured punitive legislation instead of preventive legislation. Mr. Thakore was of the view that export inspection agencies should be replaced by export promotion councils, to be supervised by exports inspection agency (EIA). He lamented that a number of quality conscious technocrats were shying away from exports, due to a plethora of regulations. He pointed out that 10 per cent of export earnings should be given back to the exporters to import the necessary inputs, to do away with cumbersome producers like cash compensatory support (CCS) among others.

Mr. Nalinakshan, Deputy Chairman, Jawaharlal Nehru Port Trust (JNPT) urged the importers to make use of Nhava Sheva Port, to avail advantages such as speedy customs clearance, bonded warehousing and modern facilities for speedy handling of containers among others. He disclosed that a regular launch service had become operational between Gateway of India and Jawaharlal Nehru Port.

In his welcome speech, Mr. A.H. Merchant, All-India Importers' Association, said that the representation made to the Union Government for removal of sales tax imposed by the Government of Maharashtra on sale of REP licences had fallen on deaf ears. He lamented that exporters and importers were subject to harassment and corruption.

RELIEFS ON IMPORT OF CAPITAL GOODS

New manufacturers have been alloweds to take advantage of the scheme governing import of capital goods at a concessional duty of 25 per cent against export obligation. So far this scheme was applicable to registered manufacturer-exporters having a three-year regular export performance.

In order to ensure fulfilment of export obligation, strict conditions have been laid down in the case of default. The Chief Controller of Imports and Exports (CCI&E) issued a public notice on Setember 7 clarifying that the c.i.f value of the valid REP licences, which are surrendered by export and trading houses to the licensing authorities as unutilised, will not be deducted from the f.o.b. value of exports for the relevant year for the purposes of calculation of net foreign exchange earnings for that year.

The same notification extended the facility of capital goods import under concessional duty with export obligation to new manufacturers". This facility may also be allowed, on merits, to other manufacturers who do not fulfil the past three year export performance criteria".

In case of failure to fulfil the export obligation, either in full or in part, within the stipulated period, the indemnity-cum-surety bond will be invoked and the bank guarantee will be forfeited. In addition, the licence holder will also be liable to pay 18 per cent interest annually on the amount of duty saved, from the date of import of the first consignment till the date of payment. This will be without prejudice to any other action that may be taken under the Import and Export Act, the notification stated.

Another public notice issued on September 10 said that unless otherwise specified in a public notice, any amendment in the import policy for registered exporters will apply to exports made on or after the date of such amendment or change.

ALKYL AMINES

Alkyl Amines Chemicals Ltd. sold 800 tonnes of amines valued at Rs. 500 lakhs for the first five months of the current year compared to 523 tonnes valued at Rs. 338 lakhs during the corresponding period last year. Production during the previous year suffered because of floods in the Patalganga area.

The company plans to enter the capital market with a rights issue of partly convertible debentures aggregating to Rs. 482.15 lakhs and non convertible debentures of Rs. 111.80 lakhs.

RI consortium in US soon for Gujarat projects

on-Resident Indians (NRIs) will a consortium in the USA for stment in industrial projects in Guj- This was disclosed by Mr. Harshad n, a US NRI, while addressing a -level committee meeting held at dhinagar to review the progress of investment in Gujarat. The meet- was presided over by the Chief Sec- ry, Mr. H.K. Khan.

Meanwhile it was decided to orga- a three-day seminar-cum-industrial ibition in the third week of January 1 to highlight the development of State as well as the potential for estment for NRIs. Dr. Parmod Vyas he Gujarat NRI Forum in the USA s present in the meeting, besides te Government officials.

The seminar will discuss investment portunities in different sectors of ustries, besides various subjects on I investment. NRIs are expected to ticipate in the seminar in large nbers. It was also decided to conduct etailed feasibility study of one or two sed textile mills having scope for ival in view of the keen interest nced by Mr. Harshad Shah in invest- in this. The State Government had omoted a new company for setting up wer project in Gujarat and NRI repreneurs could invest in it. He said t similar investment opportunities uld also be available in GSFC pro- ts such as phosphoric acid plant, mel- ine project etc., and in diversification ojects implemented by existing joint tor projects such as GACL etc., Mr. an added.

MA SEEKS REDUCTION OF CISE DUTY

Manufacturers of cosmetics and toile- es have sought reduction in the rate excise duty, which at present is over 0 per cent. According to the manu- turers, the high rate of excise duty leaves a very little margin, restricting the growth potential. The Indian Soap and Toiletries Makers' Association (ISMA) made a representation to the Finance Ministry to bring down the duty rate at least to the level of other consumer products like processed foods, coffee and chocolates.

Addressing the annual general meeting of the Association at Bombay its President, Mr. P.M. Sinha, said that the high duty rates have resulted in the spurious products flooding the market. The Association has requested the Government to make production of spurious products a cognizable offence. The Association has also sought removal of glycerine from the open general licence as large scale cheap imports have already affected the domestic industry. ISMA wants the item to be included in the limited permissible list.

According to Mr. Sinha, the costs of soap and synthetic detergents have gone up substantially due to the high prices of raw materials, especially vegetable oils and caustic soda. Mr. Sinha expressed concern that the introduction of Consignment Tax will seriously affect the industry, as the cost of raw materials as well as the end products will go up further.

MIDC PLANS TO BUILD LARGEST INDUSTRIAL ESTATE

Maharashtra Industrial Development Corporation (MIDC) is planning to build the largest industrial estate in the State at Butibori near Nagpur. The area of the proposed industrial estate is 2,439 hectares, consisting of 2,190 hectares of private land and 249 hectares of Government land. A notification for acquiring the private land has already been issued under the Provisions of the Maharashtra Industrial Development Act. The land acquisition is in progress. After the land is taken possession of, the State Government will transfer the same to MIDC for constructing the proposed industrial estate.

Sources in MIDC say that engineering units will be set up in large number at Butibori industrial estate. Butibori is located on Nagpur-Wardha Highway (National Highway No. 7), and it is 25 kms away from Nagpur. Butibori also has a broad gauge railway station (Central Railway) with a goods yard, and connected with Madras, Bombay, Calcutta and New Delhi. Once the land is acquired, Butibori industrial estate can come up within six months. Chandrapur thermal power station is located at a distance of 120 kms from Butibori.

Once Butibori industrial estate is set up, Trans Thane Creek (TTC) will be the second largest industrial estate in the State, with an area of about 2,000 hectares. The turnover of industrial units in MIDC areas during 1988-89 amounted to Rs. 8,393 crores in 1988-89, compared with Rs. 7,860.72 crores in 1987-88. MIDC has set up electronic zones at Pimpri-Chinchwad, Nagpur and Chikalthana-Aurangabad. MIDC is constructing a dam across river Savitri in Mahad. The work of water supply scheme for IPCL at Nagothane is in progress, and also that of Barvi water supply scheme, and Gondia water supply scheme. MIDC has completed the Tarapur water supply scheme.

AP LIKELY TO GET N-POWER STATION

A.P. Government's hopes of having a nuclear power station located in the State have brightened. Recently the Chief Minister Dr. M. Chenna Reddy, referring to the discussions he held with Dr. P.K. Iyengar, Chairman of the Atomic Energy Commission, stated that the Centre was inclined to such a project. Dr. Reddy has also written to the Prime Minister Mr. V.P. Singh, on locating a nuclear power station in the State. Dr. Reddy also hinted at private sector participation in the project.

IBRD agrees to set up special oil facility

The World Bank-IMF meeting on September 27 decided to launch a "special oil facility" to help the developing countries including India if the Gulf crisis continued beyond this year. Addressing a press conference at the end of a two-day World Bank-IMF annual meeting at Washington, World Bank President Barber Conable said the proposed arrangement would be parallel to the IDA, a concessional lending facility, but not exactly like IDA.

He, however, was hopeful that the situation, arising out of the spurt in oil prices, would be met within the existing institutions. Only as a last resort, the bank would consider the special provision as suggested by India and some other developing countries. The Indian Finance Minister, Mr. Madhu Dandavate, had wanted the special arrangement to come into effect immediately in view of what he called the recent developments in the West Asia.

In sharp contrast to IMF managing director Michel Camdessus, Mr. Conable had an open mind to deal with situation as it evolved. The IMF chief had opposed the idea of special facility, insisting that the world body's existing institutions, with certain modifications, would be adequate.

Mr. Dandavate, however, felt it might not suffice in view of the serious nature and favoured a facility with easy access and flexible terms. The Finance Minister said the present crisis was no less serious than that in 1974 when the bank had introduced a concessional facility. India would have to bear an additional annual burden of $2.8 billion, putting strains on its balance of payment position, he maintained.

Other issues which figured at the meeting included poverty alleviation programme, debt crisis, situation in Eastern Europe.

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INDUSTRIAL PRODUCTION INDEX UP

According to the quick estima
index of industrial production
(base 1980-81 = 100) issued by the
tral Statistical Organisation (CSO
general index for June stands at 2
higher by 12.8% as compared to the
responding month of 1989. Taking
account the IIP figures released u
May and the quick estimates o
index of industrial production for J
the average index of the first t
months of the financial year 199
works out at 201.4 which is highe
13% than the index of 178.2 for the
responding period of the previous y
The index growth rate for June over
corresponding month of the prev
year was 7.1 for mining, 13.5 for m
ufacturing, 13.8 for electricity and
for the general index.

STEPS TO CHECK RUBBER PRICES URGED

The Jullandhar Rubber Goods'
nufacturers Association (JRGMA)
urged the Govt. to take some immed
measures so that the prices of raw
ber, synthetic rubber and latex coul
checked and the rubber based indu
could be saved from an imminent
sure. In a press statement issued at N
Delhi recently the Association Secre
Mr. Avnish Arora has alleged that
the patronage of the Union Gov
ment', the prices of natural rubber h
gone up by Rs. 4,000 per tonne
Rs. 22,000 per tonne in last fifteen d

The statement said that the Gov
ment was putting another burden on
rubber industry by way of increasing
cess on rubber from fifty paise per
to Rs. 2 per kg. This rise is comin
such a juncture when the industry
already in fix over the recent price
in natural rubber. The release reque
the Government to revoke its re
decision of not allowing the import
natural rubber.

Book Review

**KANE: THE INDIAN CHEM-
L INDUSTRY IN RETRO-
CT 127P COLOUR PUBLICA-
NS, 1990, Rs. 100.**

s a privilege and a pleasure for me
view this 'history' made and rec-
d by actor, himself, with assistance
an exceptionally competent editor:
T.P.S. Rajan. The backdrop for this
ovided by the distinguished author,
e opening paragraph of his Preface:

> It is rare for an individual to be
> resent when social and economic
> hanges take place rapidly due to
> lanning; even more rare to par-
> icipate in the process of change;
> nd to have a long life-and friends
> who insist on maintaining a
> ecord of changes that took place.
> The present book represents this
> rare occurrence...

r. Kane turned eighty on March 2,
0 and, thanks to his publisher, Mr.
. Raghavan, the present book was
ceived and published in time to
nmemorate this great event. the
ends' include Dr. G.S. Laddha who
ms to have helped lay the foundation
this perspective, by honouring Dr.
ne to deliver the A.L. Mudaliar
lowment Lecture at the Madras Uni-
sity in 1982. Two or three of the
pters are based on this lecture.
ners are derived from Dr. Kane's
ers and speeches published in var-
s journals, also reports of the numer-
committees which he headed during
most eventful career. The editor
st have had an envious job in sifting
selecting material from the wealth
lata available to him. All this mater-
has been reproduced largely in the
hor's own words and the editorial
nges made to maintain a proper
uence of events have been approved
the author. Having known the author
for nearly thrityfive years, and
erved him at close quarters —
ether in his official capacity as the founder-architect of the planned development of the chemical industry in India; or in the course of one of his many affiliations incuding as founder-builder of the Indian Institute of Chemical Engineers, registered in 1947, I agree with the editor that this modest volume cannot claim to do justice to the work and achievements of this doyen of the Indian chemical industry.

These are, perhaps, more fully covered in Dr. Kane's unpublished manuscript, appropriately titled Sweet and Sour, which I have had the privilege to browse through. With his phenomenal memory, which seems to be improving with age, it should not be difficult for Dr. Kane to update this material — hopefully, in time, for his next birthday, as a gift to himself and to the nation.

Every time I meet him, I keep nudging him about this and hope that one day I can persuade him and even help him in this endeavour.

A shrewd judge of people and events and a keen observer, Dr. Kane goes well beyond the chemical industry to provide an insight into some of the other interesting factors. Two examples: Dr. Kane talks rather nostalgically about the Knonkar Railway which was first mooted, perhaps, at the beginning of this century, but not likely to pass through his birthplace, Depoli, even by the end of the century! So far it has not progressed even beyond Roha, though such a link between Tarapur and Ratnagiri, via Bombay, would have given a further boost ot the chemical industry and at the same time provide funds for the development of the Maharashtra State as a whole; Brain drain is a very topical subject now-a-days, but Dr. Kane, like Rajiv Gandhi (who termed it a Brain Bank), looks at the positive side of it:

Indian professionals working in the U.S.A., represent an ethnic group in that country with the highest percapita annual income. With appropriate incentives, these non-residents can form a most valuable source of overseas investment for the modernisation of our country.

I have no hesitation in recommending this book as a compulsory read by everyone concerned with planning and setting up of industries in general, not only chemical, for it is hard to find an item which is not chemical! It is an interesting history of an industry and a sort of autobiography, given an appropriate structure and dimension by it's worthy editor.— O.P. Kharbanda.

**BRANDON GUIDE TO EURO-
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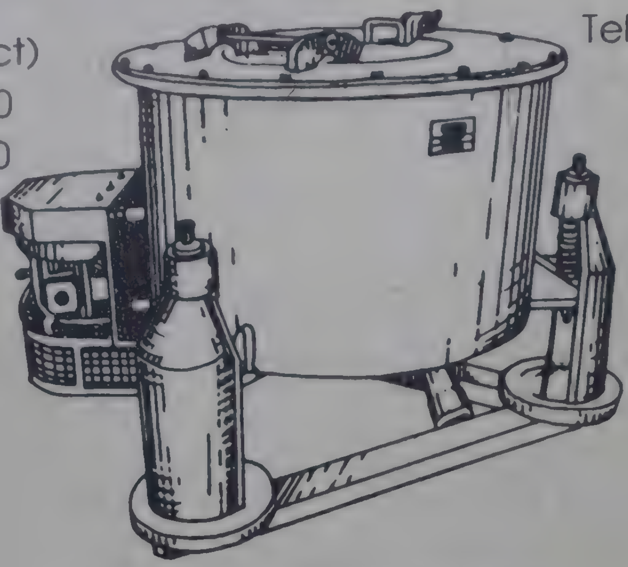
03054-1244, USA.**

Brandon Associates, a publisher of specialized titles to the chemical industry have announced the publication of a 165-page volume entitled. The Brandon Guide to European Custom Chemical Synthesis Services. The directory contains extensive information about chemical firms in Europe that offer toll or custom chemical manufacturing.

This comprehensive directory detailed descriptions of companies, their corporate affiliation, key contacts, plant locations, unusual raw materials, unit chemical processes, major chemical processing equipment and utilities, analytical capabilities, waste treatment and FDA manufacturing status.

The Brandon Guide to European Custom Chemical Synthesis Services is divided into three supplier sections. The first, and main sections, describes in detail over 140 levels of information gathered from custom chemical suppliers in Europe.

In addition, 160 different chemical reaction and processing capabilities are extensively cross-indexed to assist the reader in locating potential custom syn-



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thesis firms for a specific project cess.

The second section consists of fi that are known to provide custom s thesis services through their advertis and other sources but did not resp in time for inclusion.

The third section lists firms that brokers for custom chemical manuf turing services. These companies g erally have a great many contacts a arrangements throughout the world a can often help in putting a complex s thesis together through multiple s pliers.

The Guide contains only those fir that actually do reactive and synthe chemistry. In doing this, the publishe have attempted to eliminate any listin that are simply blending, screenin grinding, bagging or other simple pr cess services. This guide, therefore, specific, it is also comprehensive; ov 200 European companies offeri custom chemical services are profil and the publication is the most compl directory of its type available.

The Brandon Guide to Europe Custom Chemical Synthesis Services of particular value to firms looking f a specialized chemical to be produc under a contract tolling arrangeme The guide is also of value to firms int ested in seeking technical or comm cial partners in Europe and tho seeking possible acquisition candidat The guide is particularly useful to pu chasing, research, commercial and pr duct development people in t chemical, pharmaceutical, and alli industries. An introductory chapter how to buy custom chemical services also included.

The Brandon Guide to Europe Custom Chemical Synthesis Service 165 pages and costs $225 per co postpaid. Foreign orders are $250 copy postpaid. ISBN No. 0-927230-(6; Library of Congress Catalog N 90-84517.

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SPOTLIGHT ON
Biotechnology & Life Sciences (Part 1)

BACTERIA EATING POLYMER DEVELOPED

Researchers in Japan at the Research Institute for Polymers & Textiles recently developed a spherical polymer which adsorbs and removes bacteria from water. Those synthetic polymers adsorb the bacterial cells and therefore immobilise the bacteria. The polymers (CMPS-PEI) are made by grafting polyethylene imines (PET) onto divinyl benzene cross-linked chloromethylated polystyrene (CMPS).

The studies carried out tested the efficiency of the polymers to remove E coli, S aureus and P aeruginose from water. The results showed that both synthetics adsorbed the bacteria with CMPS-PE 1,600 (PEI of molecular weight 600) the most efficient.

The adsorption is brought about by the negative charge on the bacteria being attracted to the positively charged PEI and PEPA unit. This conclusion is backed up by the fact that retardation of the process occurs when conditions are made saline. Chlorine has up to now been the standard household disinfectant, but is prone to react with dissolved organic substances to produce halomethanes and other such carcinogens. Alternatively, other disinfectants leave the bacteria in the water as a residue. (*Mfg. Chemist.*, 6/1990, p. 17).

A NEW ROUTE TO BIOSENSORS

A new method for insolubilizing biological reagents on metallic surfaces can be used to make prezoelectric and electrochemical biosensors report researchers at Du Pont, (Wilmington, Del. USA).

The method involves spontaneous and irreversible formation of avidin monolayers on gold and silver films evaporated on glass or quartz surfaces. Avidin binds biotin and biotinylated reagents that can be used for analytical detection.

The researchers demonstrated such an approach by using an avidin-coated quarter crystal microbalance to detect a target strand of viral DNA. When a biotin oligonucleotide conjugate (complimentary to one section of target strand) and an enzyme oligonucleotide conjugate (complementary to another part of the target) are incubated with a sample, a biotin-DNA-enzyme hybrid forms when the target strand is present. The avidin-coated microbalances surface is then exposed to the sample and washed to remove any unburnt species, and enzyme substrate is added. The product of the enzyme catalyzed reaction is an insoluble material that deposits onto the microbalance surface. The increased mass causes a change in microbalance frquency that is proportional to viral DNA concentration, the researchers find. (*J. Am Chem Soc.*, 112, 3239 (1990)).

A RUTHENIUM COMPLEX PROVES A GOOD LUMINESCENT PROBE FOR DNA

A novel transition metal complex that luminesces upon binding to DNA may be applicable as a sensitive probe for DNA assays researchers at California Institute of Technology and Universite Louis Pasteur, Strasbourg, France.

The group had earlier developed Ru(1 10-henanthroline)$_3^{2+}$ and its derivatives as spectroscopic probe for DNA structure, but high background luminesence of the free (unbound) form of the complexes, weak binding affinities, and low luminesence enhancement upon binding DNA prevented their broad application as probes.

Now the group finds Ru (2, 2-bipyridine)$_2$ (dipyrido (3, 2- 2, 3-C phenazine)$^{2+}$ binds avidly to DNA, displays intense photoluminesence in it presence, and shows no backgroun luminesence in aqueous solution a ambient temperatures. It also respond sensitively to difference in helix structure via changes in both photoluminescence intensity and emission maximum The above researchers conclude, therefore, that Ru (bpy)$_2$ (d ppz)$^{2+}$ can serv as a true molecular light switch fo DNA structure and tethered onto oligonucleotides. The complex may be useful as a sensitive non-radioactive luminescent DNA probe in both heterogenous and homogenous assays. (*J. Am Chem Soc.*, 112, 4960 (1990)).

A NEW CONTINUOUS GLUCOSE ISOMERIZATION TECHNOLOGY

A new continuous glucose isomerization technology to produce a high fructose corn syrup differs from conventional systems, in which immobilized isomerases are cyclically discarded after inactivation. The new process employs a column of a solid, inert, regenerable carrier that has a high protein binding capacity. An enzyme solution containing a pure isomerase is gradually added to the column during isomerization. The developers R. Antrim, N Lloyd and A Auterinan claim several advantages:

* Flow rate is adjustable according to current needs
* Uninterrupted operation for up to two years
* Fewer columns needed compared to discontinuous make/reload systems
* Lower costs. (*Starch* 1989, 41, 155).

AN EXPERIMENTAL BIOPROCESSING PILOT PLANT ESTABLISHED AT THE PENNSYLVANIA STATE UNIVERSITY

American Universities are taking

increasing interest in bitoech research to maintain and strengthen US lead in biotechnology. On line with this progressive trend, new pilot plant at Pennsylvania State University's Bioprocessing Research Centre offers expertise and equipment of scale of biotechnology projects from laboratory processes to mass production.

According to the pilot plant manager Todd Brokhart, the University's Park based unit 'is designed for flexible manufacturing to meet a wide variety of project needs'. The plant includes facilities for fermentation, cell culture, separation and purification. The first company to use the pilot plant will be Bio-Proteins, Reading, Pennsylvania, which has signed an agreement with the bioprocessing centre for work on a fermentation process that recycles agricultural and food processing wastes into animal feed ingredients. (*C & EN*, 6/4/90, p. 31).

US — JAPANESE AGREEMENT ON DEVELOPING DISEASE RESISTANCE IN VEGETABLES VIA GENETIC ENGINEERING

Calgens Inc. and Sakata Seed Corp, the leading seed company in Japan have signed an agreement to genetically engineer disease resistance in Sakata's 'Crucifers' vegetable products line, which include broccoli and cauliflower. The project is designed to reduce or eliminate the use of fungicides on vegetable crops for specific diseases. Over $ 225 million is spent annually on vegetable crop pesticides in USA alone. (*CMR*, 4/9/90, p. 9).

MALE STERILITY GENE FOR CROPS DEVELOPED

A Belgium firm, Plant Genetic Systems (PGS) has reported that it has isolated a gene regulator that prevents pollen development in most types of crop plants. The company has successfully applied the new technique to rapeseed. This will allow seed companies to develop the first commercial rapeseed hybride. PGS researchers believe the promoter may be almost 'universal' among plants, so theoretically it could be used to induce male sterility in most cash crops. The technique was developed under an agreement with the Univ. of California, who supplied PGS with biological materials. For more information, contact; Plant Genetic Systems, Jopzaf Plateaustreat 22, B-900, Ghent, Belgium. (*Inform*, 4/1990, p. 378).

NOVEL USES FOR FUNGI IN BIOTECHNOLOGY ON THE HORIZON

Fungi are well known for their ability to produce biochemicals, enzymes and secondary metabolites, including important antibiotics, such as penicillin. As a conservative estimate, some 130,000 species of fungi have been isolated.

Ever since the early part of this century, when citric acid was first produced on a large scale, the main industrial use of fungi has been associated with the production of fermentation products, including antibiotics, enzymes and a range of biochemicals. Ethanol, citric acid, glucoric acid, amino acids, vitamins, mucleotides and polysaccharides provide examples of primary metabolites produced by fungi, while antibiotics such as penicillin, the cephalosporins, fusidic acid and important secondary metabolites.

While fermentation products continue to dominate fungal biotechnology attention is increasingly being devoted to the wider industrial application of fungal activity. For example, fungi have been evaluated for use in:

- Environmental biotechnology
- Treating liquid wastes and bioremediation of polluted soils
- Minerology and biohydrometallurgy
- Biomass production, including edible protein
- Fuel technology, particularly in coal solubilization

Extensive research is under progress in various laboratories around the world on the use of fungi as biocontrol agents to eradicate weeds and to control infections of plants caused by insects and pathogenic fungi.

JAPANESE-AMERICAN AGREEMENT TO DECIPHER THE HUMAN GENOME WITH THE JAPANESE FIFTH GENERATION COMPUTER

Japan's celebrated 5th generation computer will go to walk from June 1990 deciphering the human genome under an agreement between the Japanese government and the Argonne National Laboratories of USA. Researchers from the two countries will work together to programme a prototype computer called the multi-PSI to match items in the huge library of genetic sequences collected by scientists trying to map the human genome.

The Japanese computer is the first tangible fruit of a 10-year project launched by the country's powerful Ministry of International Trade & Industry (MITI) in 1982 to develop a computer capable of processing knowledge rather than numbers. The project is not yet close to achieving this goal, but has made advances in building computers consisting of many different processors operating simultaneously.

Under last June agreement the Japanese Institute will install terminals at Argonne through which American researchers will communicate with the multi-PSI in Tokyo. (*New Sc*, 6/2/90, p. 27).

GENE SCREENING FOR CYSTIC FIBROSIS TO BEGIN IN BRITAIN

A pilot programme of screening for cystic fibrosis begins this summer in three centres around Britain. If their pilot projects are successful, a national programme could follow. Britain has

million carriers of the underlying
tic defect and 6,000 people with the
ase. Researchers at three hospitals
ondon, the Western General Hos-
in Edinburgh, and the Univ. of
es in Cardiff are directing the pro-
s with funding from the Eystic Fib-
s Research Trust.

he simple DNA test, which involves
ng a blood sample or testing the
th for cheek cells should detect 80%
arriers. The Scottish project will test
00 pregnant women, calling in their
ners for a test if the woman is found
itive. The English and Welsh tests
be carried out in doctors surgeries.
ch of the money for the project will
for counselling. (*New Sc.*, 6/2/90,
7).

ECTRICITY CAN INTRODUCE REIGN GENES INTO POLLENS

A string burst of electricity is provi-
g a new way of introducing foreign
A into pollens, opening up the pos-
ility of a new way to genetically
ineer important crop plants. The new
hnique called 'electroporation' has
ently been used to introduce a gene
n a bacteria into a tobacco plant, and
gene was then passed down into the
nt's descendants.

Researchers James Saunders and
njamin Mathews from the US Dept
Agriculture, have developed elec-
poration in pollen. They begin with
herichia, a common bacterium found
the human intestine and extract a
e from it that produces a protein
led Beta-glucuronidase — known as
S.

They then take pollen grains from the
hers of Nicotians gosei, a plant
sely related to smoking tobacco, and
the pollen in a culture that causes
grains to germinate. Once the pollen
ins have begun to germinate and
d out pollen tubes, the researchers
the culture with bacterial DNA and
the mixture in a tube that contains
two millimetres apart.

Using a strong current between the electrodes — kilovolts per cm — 80 microsecond pulses, the researchers zap into pores in the sides of the pollen tubes. The pores stay open for as long as 30 mins and are too small to be seen, but the bacterial DNA can enter the cells of the pollen through them.

The altered pollen grains are then placed on the stigma of a tobacco plant, where they fertilize the flower. The flowers produce seeds and from these the researchers have grown plants. The adult plants were found to contain GUS, the protein produced according to the code of the gene.

Electroporation may become a useful technique because genetically engineered plants are more difficult to produce than are animals. There are many viruses and bacteria that infect cells and can transmit new DNA into the infected cells of animals.

Agricultural researchers have used Agrobacterium tumefaciens in this way, but Matthews says that 'its host range is limited and many important crop plants cannot be infected with it'. Another possible method in some plants is modifying protoplants — wallless single cells — and then growing complete plants from the altered protoplasts. But many plants — including the crops of greatest interest — cannot easily be regenerated from protoplasts.

The idea of introducing engineered DNA into pollen is not a new one. Saunders and Matthews say that scientists have 'spent many years trying to get DNA inside pollen' but have been thwarted by pollen's tough outer membrane. This thick protein coat also resists electroporation, which is why the pollen must be germinated. The sides of the pollen tubes which grow out of germinated grains are only a few molecules thick, and one easily breached by the electric field in the pulse generator.

CORAL CHEMISTRY INTIMATELY LINKED TO ENVIRONMENT POLLUTION

The skeletons of stony corals are made of calcium carbonate in the form of aragonite secreted by the coral polyps. Though the process by which the skeleton forms, is nuclear, the coral probably removes calcium from sea water and combines it with inorganic carbon, consisting of carbon dioxide from respiration and bicarbonate from sea water. It has been shown recently that calcium carbonate from sea shells and cords is better absorbed by the human body and help bone calcification particularly in old people suffering from osteoporosis. Therefore, proprietary formulations of calcium carbonate from sea shells or corals have become quite common.

Different forms of coral have characteristic skeletons — the very solid brain corals and the more fragile branching staghorns, for example: The type of skeletons is determined by the balance between the processes of calcification and the extension of the animal's tissues. The tissue of brain coral, for example, extends very slowly while laying down calcium carbonate at a very constant rate, so the staghorns, on the other hand grow much faster, while depositing calcium carbonate at similar rates and so are much less dense.

The rate at which the coral skeleton is laid down is strongly influenced by the amount of light available, because there is a direct link between photosynthesis by the coral's synbiotic algae and the rate of calcification. The temperature of the water around the coral reef is also important, the optimum temperature of the deposition of calcium carbonate for the growth of coral, is between 26 to 27°C. If the temperature falls below 23°C or rises above 29°C, calcification slows dramatially. Therefore, the future green house effect will have tremendous implication on the changes in temperature and light intensity produce recognizable bands in the coral. Researchers have been able to chart such change over the past 750 years from the patterns of banding in some massive brain corals.

Other environmental factors that influence the growth of corals are salinity, the amount of sediment in the water and the concentration of nutrients around the reefs. Most corals are adapted to life in clear water containing very low concentrations of inorganic nutrients, such as phosphate and ammonium. An excess of phosphate alters the architecture of the coral skeleton, producing a very fragile structure. The inorganic chemistry of calcium carbonate precipitation suggests that phosphates may be acting as 'crystal poisons'. Phosphates, particularly polyphosphates, fit almost perfectly into the growing calcium carbonate crystal, affectively inhibiting further growth of the crystal or leading to the formation of 'stressed' growth forms.

With the Great Barrier Reef as a major tourist attraction, tropical Australia is experiencing a massive coastal development as well as a huge increase in activity on the reef itself. The influx of phosphate from sewage, added to the innoff from agriculture and effluent from industry on the mainland will inevitably add nutrients to the water unless strict controls are enforced.

Already the efforts of pollution are visible on reefs surrounding island resorts such as those around Green Island (off Cairns) and reefs subject to heavy recreational use, such as John Brewer Reef. Here the range of colors typical of a living reef has largely been replaced by the monotonous green of algae that have overgrown dead control. In other parts of the world, almost all coral reefs close to centres of population have been destroyed, as if homosapines is the big scourge of this planet. The Great Barrier Reefs must suffer the same fate as, for example, the coral reefs off Japan. (*New Sc.*, 6/2/90, p. 45)

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Science Briefs

JMSTICK — A GOOD ANTI-
AGULANT

eeds of the drumstick tree form a
l anti-coagulant when mixed with
er and could be very useful in the
ntry's rural water supply schemes,
udy has found. Experiments con-
ed by Dr. P. Pratapa Mowli, profes-
at the Sri Venkateswara University
Tirupati, at the Abraminch Water
hnology Institute in Ethiopia, have
wn that drumstick seeds are as effec-
as routinely used alum in remov-
turbidity in water.

imilar findings have been reported
British researchers also. Drumstick,
anically known as Moringa oleifera,
ws in the tropical and sub-tropical
ions of Asia, Africa and South Amer-
. When mixed with river water, the
mstick seeds give water-soluble pro-
ns that bind individual particles of
terial together, forming what is
own as a floc.

Bacteria and viruses become
neshed in the floc, and the suspended
ticles begin to slowly settle down
er some time. The action is similar
that of aluminium sulphate which is
dely used in industrialised countries
l is quite costly. Dr. Mowli, who
ently participated in an international
rkshop on infrastructure for low cost
nmunities, held in Hyderabad, said
t the seeds can be harvested from the
nt within 12 to 15 months of plant-
. Each fruit on an average gives eight
lthy seeds. The powder for coagula-
n can be obtained from the kernels
er removing the seed shell.

NC COATING TECHNIQUE TO
OTECT ALUMINIUM LINES

The Central Power Research Institute
PRI), Bangalore, has developed a
c coating technique that protects
rhead aluminium lines carrying high
tage power from pitting corrosion, a
major problem in coastal areas. The zinc coating technique, for which the CPRI scientists won the National Research and Development Corporation (NRDC) award this year, involves passing thin strands of aluminium wire through a bath containing zinc solution. Zinc particles are deposited on the aluminium and the strands are knitted together to form a power conducting cable.

Dr. P.R. Krishnamoorthy, CPRI deputy director and head of the project, said that the zinc forms a thin, 5-15 microns thick coat on the aluminium and guards against the action of sodium chloride, the prime cause of pitting corrosion. Pitting corrosion cuts into the wire, instead of spreading on the surface, causing it to snap. Any small unevenness on the wire is a likely place for the corrosion to begin. The coastal environment leads to the deposition of sodium chloride on the cable surface.

Earlier techniques to arrest pitting corrosion consisted of altering the molecular structure of the cable material by introducing alloys into the aluminium. This procedure was costlier by 50 to 100 per cent. Besides, the cables made of alloys were not totally resistant to pitting corrosion.

The CPRI scientists are testing wires dipped in zinc solution at a location in Dakshina Kannada district of Karnataka alongside a normal aluminium wire. The zinc-coated aluminium wires have not developed any corrosion for the past 21 months, compared with wires without coating which last for a maximum of six months.

Dr. Krishnamoorthy said the technique prevents the chloride in the saline coastal environment from reaching the aluminium. Zinc itself does not react with the chloride. The zinc coating also does not affect the current carrying capacity of the aluminium in any way and merely acts as a protective shield. The weight addition is negligible and the advantages are longer cable life, less pressure on service crew and elimination of a major cause of power breakdowns.

Dr. Krishnamoorthy said several industries have come forward to adapt the CPRI technology. Pitting is often difficult to detect as it takes a few months of corrosion before the pit actually shows up. By this time it is too late. Once sodium chloride deposits accumulate on any indentation or uneven part of the cable, rapid dissolution of the metal occurs and the process accelerates over time.

A NEW CHEMICAL FOR TEXTILE PRINTING

A compound extracted from the leaves of the plant Litsea polyantha, which usually grows in the sub-Himalayan tracts, is helping researchers print textiles. Litsea polyantha, an evergreen plant which belongs to the family Lauraceae, is available in West Bengal, Assam, and Dehra Dun and Saharanpur in Uttar Pradesh. Other species belonging to Lauraceae have also been reported to yield the printing chemical.

Researchers of the Indian Institute of Chemical Biology, Jadavpur, and the Artex Quality Dye Printers of Textiles, Calcutta, followed a simple technique to isolate the chemical from the dried leaves of L polyantha. They first treated the leaves with chloroform and methyl alcohol to remove their colouring matter.

Next, they extracted the leaf residues with caustic soda solution to obtain a gummy substance which acts as a thickener and has a structure similar to that of polysaccharides. The gummy substance is highly useful for printing fabrics like cotton, silks and polyesters, say the researchers who reported their findings in the "Journal of Institution of Chemists". The report adds that a paste of the substance in acetic acid can be preserved for seven to eight days.

KEROSENE FROM METHANE

The National Chemical Laboratory, Pune, recently developed an alternative method of producing kerosene, which does not rely on crude oil but natural gas or methane from wastes. At present, the main source of kerosene and diesel is crude oil, but scientists are on the look-out for alternative sources in the face of an acute shortage of petroleum products.

Researchers of NCL report that natural gas, comprising methane and other lower hydrocarbons, can also be a source of kerosene. The advantage is that where natural gas is not available, methane generated from gobar gas plants can be used. Methane can also be generated through digestion of domestic and industrial wastes. In fact, they are a better source of methane as they yield 70 to 80 per cent of the gas, compared to 50 to 60 per cent given out by gobar gas plants.

An additional advantage of using these waste resources is that they are more abundant than crude oil and can be regularly managed. It is doubtful, though, whether there will be enough natural gas to meet the demand for kerosene, as it is one of the raw materials for making fertilisers and methyl alcohol.

The NCL researchers have developed a two-step catalytic process for making kerosene and diesel either from methane or natural gas. In the first step, methane is transformed into olefins which, in the second step, are converted into kerosene and diesel. The NCL investigations are on a laboratory scale. For large-scale trials, the Bharat Petroleum Corporation Ltd., Bombay has set up a Rs. 60-million plant which will operate with technical assistance from NCL and Davy Power Gas India Ltd., Bombay.

HYPOGLYCAEMIC EFFECTS OF A FEW MEDICINAL PLANTS

Four traditional Indian plants, including Ocimum (tulsi) and Azadirachta (neem), have been reported to decrease the blood sugar of diabetic rabbits, opening up possibilities of their use in diabetic therapy. In India, a large number of single and combined plant preparations are used along with hypoglycaemic drugs to control the disorder.

A recent report by biochemists from the University of Kerala, Trivandrum, says extracts of four plants — Ocimum sanctum, Azadirachta indica, Aegle marmelos and Murraya Koenigii —showed considerable hypoglycaemic activity. The report by researchers K.S. Santhoshkumari and K.S. Devi was published in the journal "Ancient Science of Life".

Of the four plants, Aegle marmelos recorded maximum decrease in blood sugar content (29 per cent), followed by Ocimum sanctum (24 per cent), Azadirachta indica (15 per cent) and finally Murraya koeigii (5 per cent). Further investigations are on to isolate the active principle of Aegle marmelos and study its mechanism of action in diabetic animals.

Administration of the extract from A marmelos for three months significantly reduced the blood sugar level of diabetic rabbits, and the effect was more pronounced with the extract in milk, the report said.

ELECTRONIC SYSTEMS FOR PAPER AND PULP INDUSTRY

The Madras centre of the Central Electronics Engineering Research Institute (CEERI) has developed electronic systems for paper and pulp industries to improve productivity, efficiency, energy conservation and quality control. The five systems have been developed by CEERI under the Appropriate Automation Promotion Programme (AA
envisaged by the Department of E
tronics (DOE) to promote automatio
industries such as steel, cement, ferti
ers, pulp and paper, jute and tea.

The five systems are: Locomon (
consistency monitor), moisture gau
GSM (grams per square metre) gau
and 'C' frame and 'O' frame inst
mentation. The systems are availabl
India for the first time and are par
ularly ideal for small paper mills. T
can be employed in mills using a v
ety of raw materials like bagasse, co
try wood, straw and waste paper.

The Locomon system measures l
pulp consistency, which is an import
parameter for producing paper with u
form quality. The moisture gauge m
sures the moisture in the paper bei
produced and helps save energy throu
optimum use of steam, while the GS
guage displays the weight of the pa
being produced.

ALL FIBREGLASS SOLAR PANELS WITH TRANSPAREN GLAZING

A Madras-based firm claims to ha
developed the country's first all-fib
glass light-weight solar panels w
unbreakable transparent glazing inste
of glass. The new solar panel raises
water temperature to 90 degrees cels
and gives more hot water in lesser ti
Developed by a small-scale unit M
Hydrodrive, it tries to overcome seve
of the disadvantages of conventio
solar panels with glass glazing.

In conventional panels the glass
heavy and tends to break often, causi
problems during transportation a
handling. Also, the glass glazi
accounts for more than 20 per cent
the cost of the solar panels, a
replacement would be a burden to b
manufacturers and purchasers.

If the glass glazing is not replac
immediately after breakage, then

lation inside the panels gets aged due to exposure to dust and in the atmosphere. The rubber ket between the panel frame and the ace of the glass glazing also deter- tes, paving the way for entry of rain dust.

n the new solar panel frame, the om cover plate and the top glazing all made of fibre-reinforced plastic P) that ensures a longer life and istance to corrosion and abrasion. FRP frame and bottom sheet offer ter thermal insulation and enhance panel's heat collection properties. e totally sealed construction prevents y leaks and possible damage from n and pilferage.

Hydrodrive's new glazing is also xible, with a very good transmittance. acts as a filter for the infra-red heat aves emitted from the inner surface of e solar panel, thereby improving its erformance. Besides, the new glazing n be bonded in the fibre-glass frame the panel, dispensing with the need r a rubber gasket.

N SEARCH OF METALLIC YDROGEN

Scientists in the United States are esearching the possibility of converting ydrogen into a solid, the implications f which can revolutionise the theory of etals. Theoretically, when a sample of ydrogen gas is squeezed between two aces of a diamond press at 57,000 times ormal atmospheric pressure, it turns nto a solid. If the squeeze is continued, t some point well over a million tmospheres, a dramatic change will ccur. The hydrogen, originally an nsulator, suddenly becomes a conduc- or — metallic hydrogen, says an arti- le in the journal "Science".

Scientists believe the metallic hydro- en might be a room-temperature super- onductor, for instance, or it could be liquid at absolute zero, the journal aid. However, there are difficulties. In addition to the technical difficulties of squeezing a sample with millions of atmosphere, researchers have found it tricky to determine exactly what it is producing in the tiny space between the two diamonds. With no ways to touch the sample directly, they rely on measurements made through the diamonds, which themselves are affected by the intense pressures.

Despite this, a few research teams have claimed they have seen hydrogen turn metallic. Scientists at the Carnegie Institution of Washington say that at about two million atmospheres hydrogen starts to become opaque, a good sign of the transition to a metal. Harvard University scientists claim that their team has evidence that one special form of metallic hydrogen appears at 1.5 million atmospheres.

The implications are vast. If one could make metallic hydrogen astronomers could study a material that may make up large parts of Jupiter and other superheavy planets. Fusion scientists regard metallic hydrogen as a possible fuel. If it could be made at several million atmospheres and then handled at normal pressures, it would provide an ideal fuel for reactors.

According to scientists, it takes somewhere between 2.5 million and four million atmospheres to make "atomic metallic hydrogen", the form of hydrogen that is predicted to be a room-temperature superconductor. At such high pressures hydrogen molecules would dissociate into pairs of single atoms. Other calculations say molecular metallic hydrogen should form at a significantly lower pressure, somewhere between 1.7 million and 2.5 million atmospheres.

Carnegie's scientists in a report in "Science' said at two million atmospheres some of the electrons attaches to the hydrogen molecules which move into new energy levels and become conduction electrons at these pressures.

In the Harvard University method, the hydrogen sample shifts its structure into what is called the hydrogen-A phase. This phase which has already been detected by Raman spectroscopy uses lasers to measure how the atoms inside the hydrogen molecules vibrate against each other. At about 1.5 million atmospheres the vibrations change abruptly, indicating some major change in the hydrogen's structure.

It is possible that the hydrogen-A phase is probably the metallic phase of hydrogen. Explaining this, the Harvard scientists said their studies centred on pressurised hydrogen at temperatures down to 4.5K, much colder than other labs can achieve with high-pressure hydrogen. If the phase transition were caused by a change in the physical structure, then the transition should occur at much lower pressures when the temperature got close to absolute zero, they say. But the Harvard researchers found that even at 4.5K, the transition came at 1.48 million atmospheres. This makes the formation of metallic hydrogen the most likely interpretation of the data.

At present, scientists are carefully examining the range between 1.5 million and two million atmospheres for conclusive evidence of the metallization, the journal said.

ALUMINIUM-AIR BATTERY

Production is about to start in Britain of an advanced new type of battery that could replace traditional diesel standby generators by using aluminium-air technology to provide reserve energy for up to 48 hours without maintenance or causing pollution.

The battery has been developed jointly by Britain's Chloride company and Alupower Inc. of the US. It will be available in two capacities, delivering 600W or 1200W, having minimum 10-year life and an energy density of six to 10 times that of the lead acid equivalent.

Aluminium-air is said to be particularly attractive as it complements existing systems. Many organisations rely on conventional lead acid battery systems to cover them for the first two or three hours of a power cut. After this, they have to resort to diesel generators which require regular maintenance. This latter role can now be taken over by the new battery.

Managing director of the industrial battery division of Chloride, Mr. Howard Kirkham said: "We are very excited by the potential of this new battery. There is clearly going to be a substantial market for it with the telecommunications companies, but that is only the start. As more companies realise the saving that can be made by using this new environmentally-friendly battery, we believe the aluminium-air reserve power unit has a very promising future for a wide range of applications."

The battery will be manufactured by a joint Alupower-chloride company at Manchester in north-west England, and British Telecom has already placed order for prototype batteries for trials in its telephone exchange. Other European telecommunications companies are also showing interest and the French National Centre for Telecommunications Research is planning tests with the battery to establish its suitability for use with the French Telecom network.

COMPUTER PATTERN RECOGNITION TO SEARCH FOR OIL

Research into pattern recognition by computer being carried out at Scotland's Strathclyde University may help in the search for new reserves of oil by seismic survey techniques.

Scientists at the University's Signal Processing Division are investigating how pattern recognition, which is a growing area of digital image processing technology, can be used to interpret seismic survey data and point to where oil may be found. In the search for new underground reservoirs, seismic sections, or maps of cross sections of the earth, are analysed and interpreted by geophysicists who use a combination of knowledge, experiment and intuition to decide on likely oil prospects.

Huge quantities of data are involved — in fact it is estimated that about two-thirds of all the magnetic tape in the world contains seismic data — so the process is time-consuming, expensive and error-prone. The Strathclyde research team is investigating ways of using pattern classification techniques to help computers interpret the seismic data. However, a major problem arises from the fact that computers are not ideally suited to deal with such details, which are basically non-mathematical in nature.

Project leader Prof. Tariq Durrani explained: "A human interpreter can overlook occasional gaps in rock boundaries and discard unwanted pieces of information, but this intuitive guesswork is not easily mapped on the kind of mathematical formula which computers deal with."

By using pattern recognition and classification techniques, specific regions can be identified within an image, allowing the computer to take an overview and make assumptions where appropriate. "If we can automatically identify important geological boundaries, then we have made a huge advance in processing and interpreting seismic data, and ultimately in the quest for oil sites" said Prof Durrani.

NATURAL CHEMICALS TO HELP BEE-KEEPERS

French scientists have isolated natural chemicals found in bee larvae which help in preventing the parasite mite, varroa, from attacking worker bees, reports the journal "Appropriate Technology". The development is said to be significant for the bee-keepi industry. Varroa Jacobsoni has be spreading throughout the world sin 1965 and has destroyed hundreds thousands of honey bee colonies. Th cling to the bees and suck out bo fluids. This weakens the bees and sho ens their lives.

The researchers found that the fema mite are drawn to the bee larvae by chemical attractant, and it is this chem ical that has been isolated. In prelim nary trials, compounds containing th chemical attractants made the mit leave their hosts when they fell to th hive floor where they were easily caug and destroyed. At present, acaricide keep Varroa partially under control, bu there are harmful side effects. Contr is made more difficult because femal mites spend some time in sealed be larvae cells where they proliferate.

INGENIOUS PAINT

An exothermic paint called MRC 001 which saves up to two-thirds of th energy used by conventional heatin systems has been developed by Japa nese researchers. In trials recently, th researchers coated the inside of an as tray with a thin layer of grey pain turned the dish over and attached tw electrodes to its sides. Electricity fron the mains, stepped down through transformer from 240 volts to just 2 volts raised the temperature of th "frying pan" to more than 100 degre celsius. The current through the pain was about 2.5 amps. While a butte chunk placed on it quickly melted, a egg fried within 30 seconds.

So far, exothermic coating technol ogy has relied on the resistance of th coating to an electrical current in orde to generate heat. No chemical reactio takes place in the new paint. It ha something to do with the electromagne tic excitation of molecules, the research ers have been quoted as saying.

The paint is described as a matrix c

rganic and inorganic substances that is oluble in an inorganic solvent. Accordg to Rustol Chemicals, the company hich has developed the paints, it can rovide a wide range of temperature rom one degree celsius to 1000 degree elsius. While the lower temperatures ould be useful for melting snow and ce from roads, roofs and aircraft, the igher ones could be used for heating pace and for processing chemicals.

NEXPENSIVE WAYS TO TAP IL

United States scientists are developng new technologies including the use f inexpensive chemicals to recover ntapped crude oil from underground eservoirs and the biological production f alcohol fuel from coal, reports an American newsletter.

According to a research scientist in Texas, thousands of millions of barrels of untapped crude oil can be recovered by converting three chemicals called lignins into componuds that flush from the ground oil that otherwise would be too costly to recover.

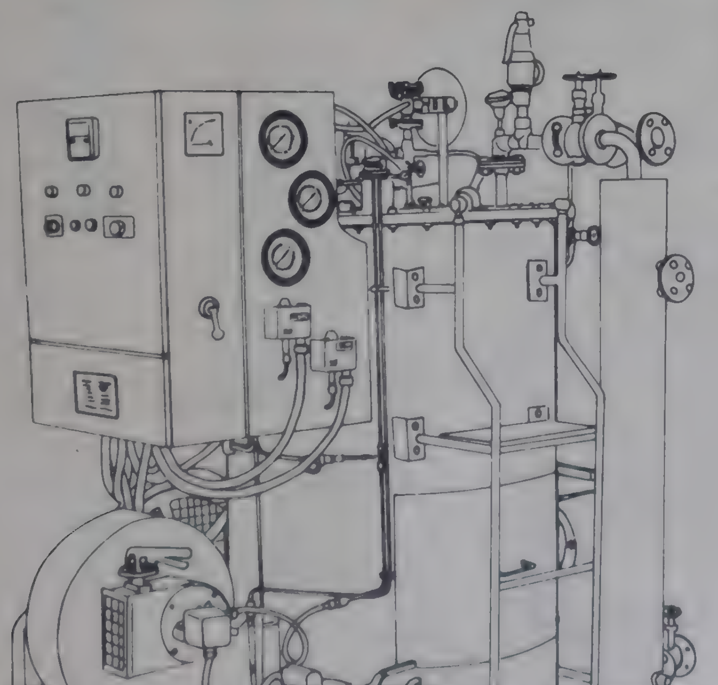
Approximately 18,000 million kgs of lignins are produced each year in the US as a by-product of the paper and pulp industry. A process has been developed to convert lignins into specialised chemicals called surfactants that are used to flush oil trapped in underground reservoirs into nearby production wells so the oil can be pumped to the surface.

The surfactants attach themselves to oil drops, squeezing them into a slurry, therby making them more susceptible to recovery. This is similar to a detergent flushing grease out of dirty laundry. Upto now the high cost and scarcity of surfactants has been a big obstacle in using so-called chemical flooding technology, which is employed in some used oil wells after the first big gush of crude oil is collected through traditional methods.

The new process reduces costs by using cheap and abundant lignins as starting material for the surfactants. Scientists at the University of Arkansas have also developed the technology biologically covert solid coal into a liquid fuel such as ethanol. There are two biological processes. One involves use of a particular strain of bacteria to turn pulverised coal into a soluble substance. Another biological culture is then used to convert the soluble coal into an alcohol.

The second process involves the use of a conventional coal gasification process — a commercial process used around the world — to produce carbon monoxide, carbon dioxide and hydrogen. Biological cultures are then used to convert the gases into fuels into ethanol.

(All the above items are from PTI Science Service — Sept. 16-30 1990.



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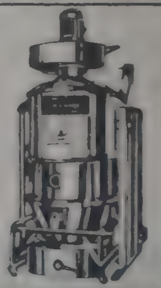

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Oil Field Disaster Management–an approach*

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TRODUCTION

Some of the major industrial disasters which occurred in e recent past have greatly aroused the public opinion and tention of National and International regulatory agencies. hese events include those which are naturally occuring, such s the:

- Earthquake that struck Mexico City in 1985, and Armenia and Khazakistan (USSR) in 1988.
- Mud slides in Ecuador in 1987.
- Release of toxic fumes from a lake in Cameroon.

They also include industry-related disasters such as the ioxin-containing release in Seveso, Italy, the propane exploion in Mexico City, the release of methyl iso-cyanate (MIC) t Bhopal, the fire and discharge of contaminated waters into he Rhine from a warehouse in Basel or the release of radioctivity from a nuclear reactor at Chernobyl.

Science has not progressed to the stage where all the causes f events leading to disasters both natural and man-made, are nderstood, predicted or effectively prevented. In the meanime, there is need to prepare ourselves to respond to these emergencies, as and when they occur. Safety experts in Indusry, on the other hand, have the philosophy that all industrial ccidents are preventable. Yet, they are realistic enough also o prepare Disaster Management Plans should such accidents occur.

While most industrial accidents can be contained within he boundaries of the industrial plant, there are those rare ases where impacts extend beyond its boundaries to affecthe plant, neighbourhood and have adverse short and long erm consequences affecting life, life support systems, proprty or social fabric. Reports of hazardous material, spills and eleases are not uncommon. In the recent past, in India, we ave had chlorine leak at calico, oleum leak in Delhi, several instances of leakage of ammonia and oleum including he latest in Bombay.

There has been a flurry of activity culminating in legislation to deal with hazards and their affect on the community at large after Bhopal. It would, hence, be worthwhile to take stock of what we have done, what are the strengths and weaknesses of our policies and decide what we need to do further.

MAJOR HAZARD

As on today, none of the legislation in Europe or India defines a major hazard. Definition of hazardous installations, processes, storage levels beyond which an installation can be deemed hazardous are available in the Environment Act, 1986, Factories Act, 1987, EEC Directive 1984 and CIMAH regulation, 1984. Major hazard is one in which the health and well being of the community is affected, social life is disrupted temporarily or permanently. This disruption could be a result of:

a. Occurance of an explosion, release of gas, toxic or nuclear materials, liquid spills, vapour cloud etc. These create a situation of emergency and considerable effort has been spent in the recent past to deal with such situations.
b. An insidious process which goes on gradually over a period of time.

After Bhopal tragedy and others, our attention in India has unfortunately been focussed on the (a) above and Nelson's eye has been turned towards (b).

RESPONSIBILITY IDENTIFICATIONS

Basics

Control of major hazards involves a triangle of:

- Those who, due to lack of control or otherwise, create hazards (creator).
- Those whose job is to protect the community (Protector).
- Those whose function is to clean up the affect of the hazards.

Hence, control of hazards would require an interaction and close co-operation of all the three agencies, if this system is to work. If one or more agencies of the above triangle does not perform or performs inefficiently, misery of the community at large is inevitable.

---

* Paper presented at the first IUPAC workshop on "Safety in Chemical production", Basle, Switzerland, September 9-13, 1990.

i) Creator of Hazards

While most will name industry, oil refinery, oil exploration and exploitation and particularly chemical industry as the creator of hazards other industries like nuclear power plants, transportation industry also show the dubious distinction of being creators of major hazards.

Undoubtedly, the major point of responsibility for control would be with the creator industry itself in their area of operation, but contingency plans to combat the situation should be ready well in advance.

ii) Protectors

The protectors of community are the various Government agencies like Inspectorate of Factories, Central and State Pollution Control Boards, Explosive Inspectorate, Boiler Inspectorate, Coast Guard etc.

Community must be kept informed about the hazards, the measures taken by the Protectors and Creators to eliminate/minimise hazards, reduce risks and mitigate hardships if, inspite of efforts, an emergency occurs. Legislations must be introduced which encourage elimination and reduction of risks by placing responsibility on all the three agencies i.e. Creator, Protector and normalisers.

iii) Normalisers

These are the agencies/organisations which have often a difficult task to restore human, social structures and mental well being of the community to the level prevailing prior to the disaster.

Normalisers also equip itself in latest technology for accident prevention, containment and health monitoring, improve the state of preparedness by constant drills and mock trials.

MAJOR HAZARDS CONTROL SYSTEM

The strategy for effective hazard control system may be as follows:

-- Elimination/reduction of hazards by using better technology, good house keeping, safety audits, employees participation and awareness, implementation of stipulations of Government Agencies/Organisations and clearances.

-- Disaster management plans be prepared well in advance in order to contain emergency situations.

-- Well coordinated efforts by creator, protector and no maliser to minimise loss of property and life and brin back the situation to normalcy as early as possible.

OIL FIELD DISASTER-PLANNING IN ONGC

Oil & Natural Gas Commission (ONGC), a Governmen of India Undertaking, is responsible for exploration an exploitation of hydrocarbon resources in India. ONGC's mai objective is self-sufficiency in oil. It is providing fuel an feedstock to power plants, mills, refineries, fertilisers, petrochemicals and other petroleum based industries beside domestic gas and LPG.

ONGC's drilling and production activities involve som degree of risk, accidents and other dangerous/disastrous situation like:

-- Blow out
-- Fire
-- Oil Spill
-- Emission of H_2S and combustible gases.
-- Helicopter crash on deck etc.

During such disasters, for the safety of personnel, offshore rigs are built under strictest quality control supervision of shipyard owners and classified society like American Bureau of Shipping etc. Government enforces rules and regulations of Safety of life at Sea (SOLAS) and all the necessary life saving equipments like life boat etc. are provided. Trained personnel are deputed to operate these sophisticated rigs and knowledge of dangers and safety training is imparted to persons working so that emergency situations could be controlled without panic. But still inspite of all these things go wrong and emergencies do arise involving damage to life and property.

Therefore, it is necessary to plan and develop procedures to deal with emergency situations, to prevent disasters through contingency plans.

CONTINGENCY PLAN

A contingency plan is a pre-planned procedure for handling emergencies with a view to minimise loss of life, property and damage to environment and bring situation under control as soon as possible. Disaster planning needs fixing up of priorities in following order:

-- Safety of life.
-- Protection of installations and environment.
-- Restoration of production.

Once the persons are rescued, action should be taken to hiting pollution, spills, controlling emergency situation and ally restoration of normal operation as they were prior to saster.

Emergency can be of minor or major nature. The emerency of minor nature can be handled locally but major emerencies where installations are damaged and there is a ossibility of a threat to safety of life or persons are likely be injured, will definitely need help from outside agency. ut the important feature of contingency plan is to prevent inor emergencies escalating into major ones.

asic Structure of Contingency Plan

. Action Plan indicating duties: starting from site of crisis, raising alarm, communication to each member of contingency plan.
. Comprehensive guidelines to all concerned.
. Information about equipments, services and other support facility required alongwith contact addresses and full specifications of equipment.
4. Chain of command and responsibility.

Crisis Management

The situation may vary in gravity, intensity and such variations would determine the degree, level and extent of response required to deal with a particular disaster situation. The role of top-level is always coordinative, interrogative, predicative and supportive in nature as such advance planning at top level will help in reducing the response time and thus in minimising the damages, and in improving the state of preparedness. The main aspects to be considered for management in crisis situation are:

1. Comprehensive guidelines are given to all concerned.
2. Overall supervision, guidance, expertise and special stores and equipments, additional trained manpower and material resources and timely replacement of these in all areas of shortfall.
3. Secure maximum efficiency and economy in implementation of plan.
4. It is neither feasible nor proposed to build up administrative capability, stores and infrastructural facilities for responding to an infrequent, irregular and unforeseen crisis situation. Rather it would be more prudent to work out arrangement whereby available administrative capabilities can be mobilised within shortest possible time with maximum effect under unified command and control structure as it is done in war time.
5. Besides the response parts for different crisis situation, plan contains many common elements such as communication, transport, regulatory rescue and relief measures, medical and hospitalisation. As such it is admissible to plan out administrative arrangements and all common elements fo various envisaged situations.
6. All special requirements for specific crisis situation ca be separately formulated and thereafter amalgamated a specific appendixes to the basic plan.
7. Formulation and implementation of such integrated pla would, however, require close interaction and cooperatio of various concerned departments and sections of adminis trations.
8. Listing of identified emergency personnel and clear chapte of duties of them. The plans are drawn and updated fror time to time.
9. Briefing the media/press for circulation of correct infor mation so as to ally undue apprehensions and preven spread of rumors which may cause panic elsewhere.
10Establishment of well equipped control room at site/nea to site, base and quick assemblage of all the essential tean members at the control room to assume charge of the sit uation.

i) Control Room

The main control room should work as nerve-centre of al emergency operations and hence should be adequately constructed/located and equipped with arrangements of rounc the clock normal message centre with skeleton staff whicl can be converted into full scale operation room once a crisi has arisen.

The duty officer should have in possession names addresses and telephone numbers of all the members o crisis management, communicate till the arrival of regular functionaries. Control in addition to adequate staf should have sufficient telephones, wireless, radio communication/hotline installed in advance and maintained,ir efficient condition.

Site Control Room should be set up nearest to the accident site to assess the situation at site and apprise timely the main control room.

Personal Support

ii)Chief Emergency Coordinator (CEC)

Main task of CEC is to assess emergency situation, take suitable action on priority to protect life, damage to property and environment and finally bring accident site into normal working place as it was prior to accident. He must visit site of accident, arrange all stores and services required, inform situation to top management, Government authorities, media, local authorities like Police etc., if required. He must keep contact with site emergency coordinator.

iii)*Site Emergency Coordinator (SEC)*

Top level person present on the site must take charge of situation and command all operations, declare emergency, if required, inform nearby installations and energise main control room. He should organise evacuation for safety of personnel and take other steps to minimise damages to property/installations with available means at his disposal.

iv)*Key personnel*

Chief Coordinator, Incharge of Main Control Room, should be assisted by the senior managers of technical, scientific and administrative wings. These persons have key role to play in advising CEC and SEC in taking appropriate decisions and implement the same. No sooner emergency is declared, they must assemble at control room.

v) *Drill Practice*

The regular drill/rehearsal will help emergency personnel in remembering details of their assigned task and enable them to react instantaneously in actual crisis situation.

DISASTER MANAGEMENT ON OFFSHORE RIG -- SAGAR VIKAS -- A BLOW OUT CASE HISTORY

A blow-out is the result of a sudden uncontrolled release of gas or gas-oil at extremely high pressure. This unexpected high pressure release occurs at great velocity and the large amounts of material evolved are at a high temperature. Hence, the risks of explosion, fire and widespread pollution are all present. Blow outs represent the potential loss of life and equipment, as well as loss of the gas or gas-oil itself, together with the associated revenue and energy content.

Blow outs can occur on drilling into an unexpectedly high geological pressure zones, from human error, equipment failure, or external causes such as collision or fire. The possibility of a blow out exists at all drilling stages, during production, and during maintenance and inspection of the drilling and production equipments. A proposed model of action in case of blow out is given at Annexure I and II.

CASE HISTORY

-- ONGC owned mobile Offshore jack up drilling rig -- 'Sagar Vikas' commissioned on 1.1.82, deployed on platform "SG" in Bombay High 150 Km. from shore equipped with life saving, fire fighting and blow out control equipments.

-- July 30, 1982 at 9.15 PM Blow out occured. All the 74 persons on board were evacuated within half an hour t safer place (Sagar Pragati) 5 Km. away.

-- At 9.20 PM, Member (Offshore) received the informatio on phone, within minutes he was in Control room at Make Towers directing operations. Fire fighting boats arrive within 4 hours and started spraying water jet over threatened rig.

-- World renowned blow out expert "Red Adair" was contacted in Houston on phone.

-- Member (Offshore)/GM flew by night helicopter to nearest location, Sagar Pragati, to assess and battle the hazardous situation.

-- July 31st 1982 at 6 AM Chairman was informed at Delhi, by 10.30 AM he was at site.

-- Another MSV Pacific Constructor equipped with powerful fire fighting pumps positioned 500 mts. away from SJ platform swung into action by spraying water. Site control room was shifted from Sagar Pragati to MSV Pacific Constructor.

-- ONGC Management identified the priorities:

a. Contain blow out, fight fire, mobilise resources equipment, and expertise from all over the world.

b. Keep morale of staff high.

c. Ensure participation of media.

-- August 1, 1982 helicopter landed on top of front leg of rig. A man got out and switched off running generator and returned by the same chopper.

-- August 2, 1982 at 6.17 AM inspite of all precautions taken well SJ-5 caught fire. Fire flames 40-50 mts. high started destroying metallic structures and most of the equipment fell into sea.

-- Gulf Fleet 46 was moving around the rig and spraying water.

-- 3rd August 1982 another fire fighting boat Gulf Fleet-47 was mobilised from Madras and MSV Flex Service with high capacity fire fighting equipment came from Dubai on 8th August, 1982.

-- 3rd August, 1982 at 4.44 PM fire died down on its own but blow out continued.

-- To drill relief well semi-submersible rig arrived on site on 14th August, 1982.

Naval ships/aircrafts, Air Force helicopters and Coast Guard vessels assisted in controlling pollution. No pollution was caused by this blow out.

Chairman addressed the nation on T.V. for 10 minutes on Blow out and steps being taken to control the blazing well.

Derrick Barge Hercules arrived on 18th August 1982 and was stationed adjoining to SJ platform. Crawler Crane was lifted by giant crane of Hercules and placed on Vikas for assisting capping operations.

Helicopter with ONGC officials and Red Adair team landed at Vikas to plan capping operations. On 27th August 1982 Hercules started clearing debris of SJ Platform and on 29th August 1982 top deck.

- 30th August 1982 well head and BOP was installed on Sagar Vikas for capping and killing operations.

- 12th September 1982 at 11.40 AM well was closed and killed, blow out situation was over.

- Damaged rig was jacked down and towed to Bombay harbour; sea bed, area around SJ platform was cleared of debris. Another rig was brought and oil producer well was successfully drilled.

OUTLOOK FOR FUTURE

As a result of lesson learnt from this blow out, following modifications have been done in the new rig 'Sagar Ratna'.

-- Helicopter landing pad on top of leg has been provided.

-- Remote Control of stopping emergency generator from life boat embarkation station has been provided.

-- Fire Monitors for spraying water in rig floor has been provided.

CRISIS VEHICLE

-- ONGC's onshore operations gained a new momentum with the arrival of Crisis vehicle which is fitted with sophisticated communication systems, first aid kit and other crisis measures and can function as an emergency control room in a blow out and other accident situations.

-- At the time of crisis, communication is a very important. With in this vehicle, communication with both drill sites and project headquarterss. (within a distance of 30 to 35 km.) is maintained by a VHF set on the vehicle. Once the first hand information is communicated, the contingency group in the Project starts working swiftly.

CONCLUSION

-- With a view to minimise loss of life, damage to property and environment and to bring the situation under control as quickly as possible, contingency plan must be updated after learning lessons from actual incidents or drills.

-- A good communication network, trained personnel, specifically required equipment and laid down emergency procedures are main key points for effectiveness of any contingency plan.

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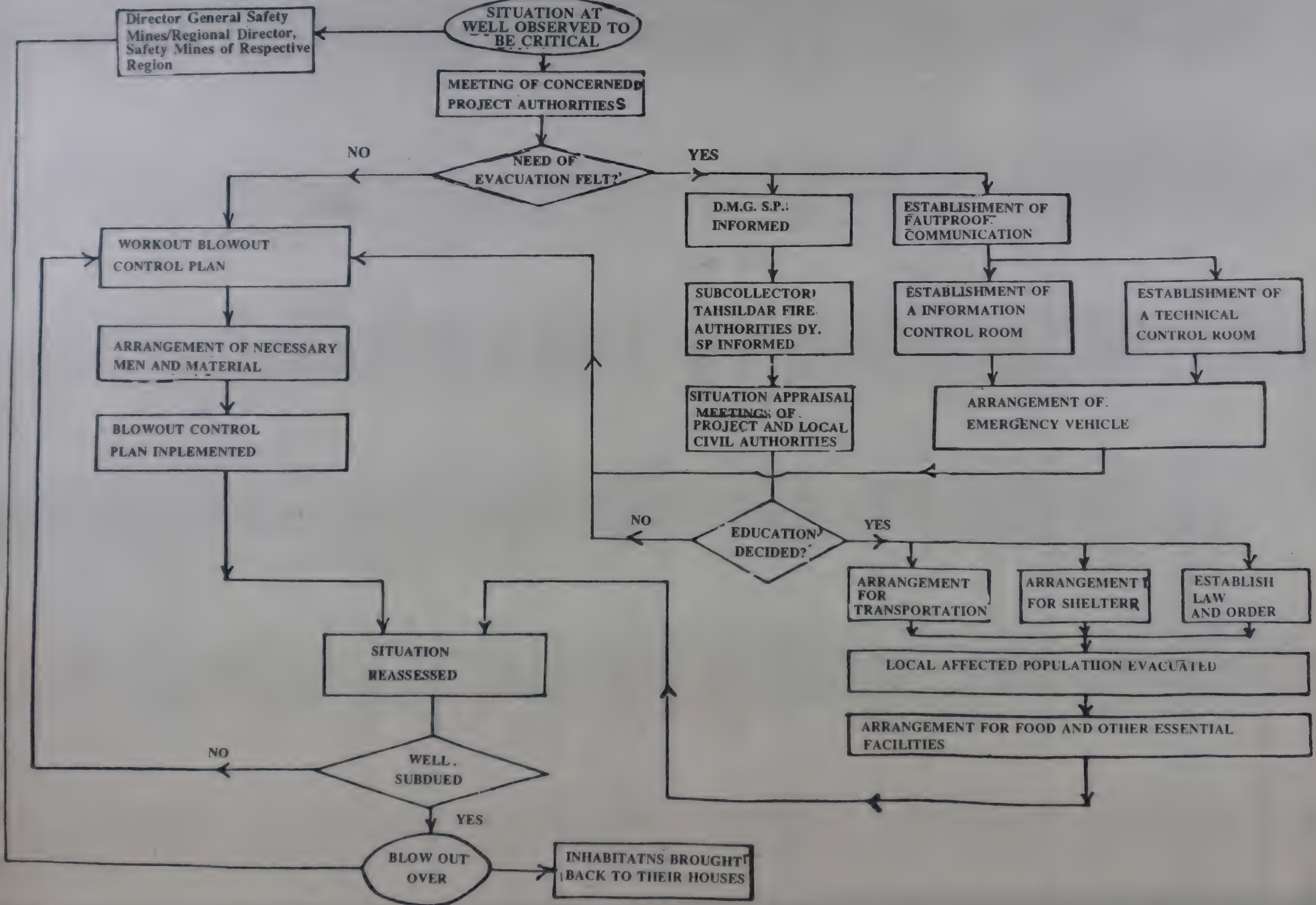
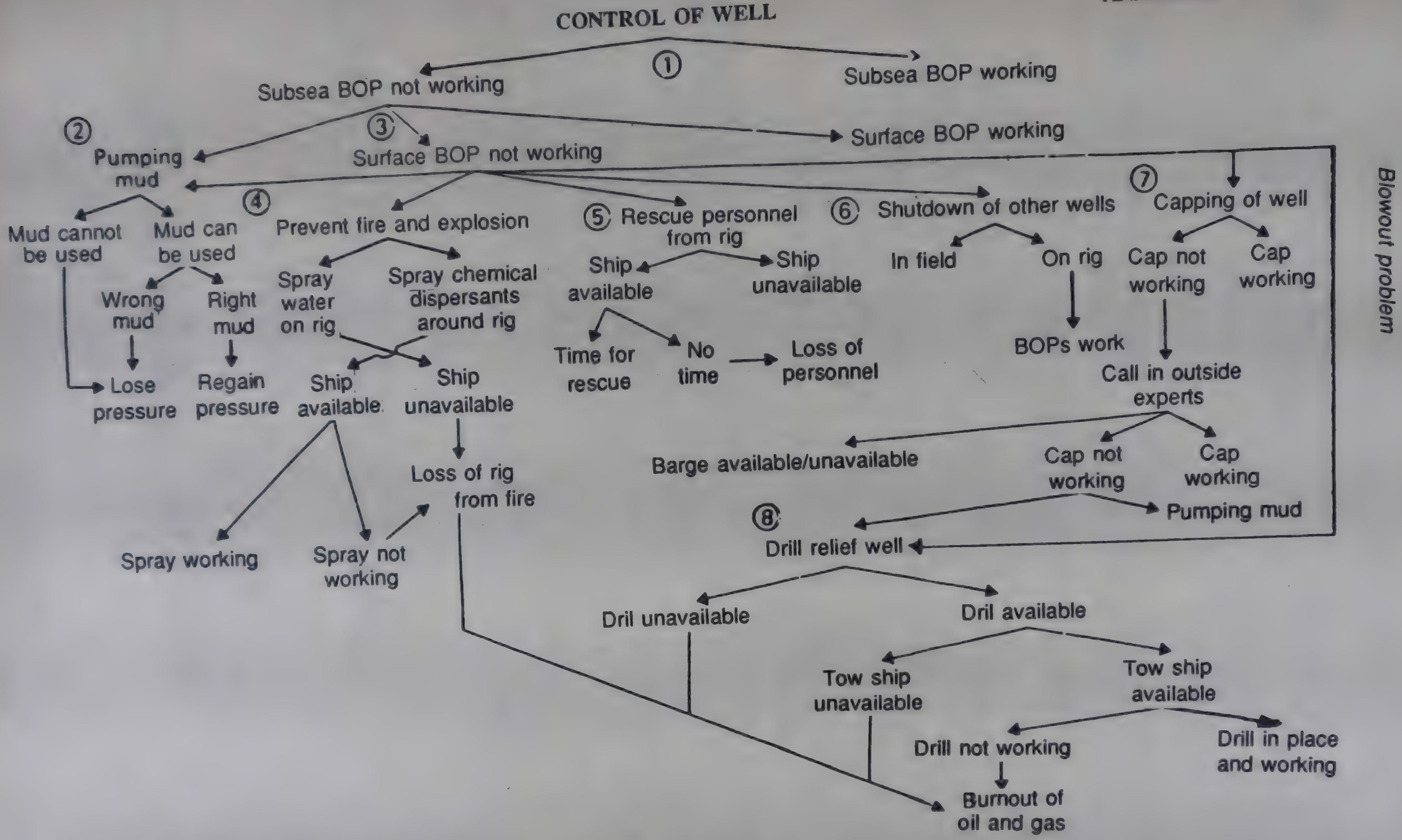
ANNEXURE -I

PROPOSED MODEL OF ACTION IN CASE OF BLOWOUT


SITUATION AT WELL OBSERVED TO BE CRITICAL
Director General Safety Mines/Regional Director, Safety Mines of Respective Region
MEETING OF CONCERNED PROJECT AUTHORITIES
NEED OF EVACUATION FELT?
NO
YES
D.M.G. S.P. INFORMED
ESTABLISHMENT OF FAUTPROOF COMMUNICATION
WORKOUT BLOWOUT CONTROL PLAN
SUBCOLLECTOR TAHSILDAR FIRE AUTHORITIES DY. SP INFORMED
ESTABLISHMENT OF A INFORMATION CONTROL ROOM
ESTABLISHMENT OF A TECHNICAL CONTROL ROOM
ARRANGEMENT OF NECESSARY MEN AND MATERIAL
SITUATION APPRAISAL MEETINGS OF PROJECT AND LOCAL CIVIL AUTHORITIES
ARRANGEMENT OF EMERGENCY VEHICLE
BLOWOUT CONTROL PLAN INPLEMENTED
NO
EDUCATION DECIDED?
YES
ARRANGEMENT FOR TRANSPORTATION
ARRANGEMENT FOR SHELTERR
ESTABLISH LAW AND ORDER
SITUATION REASSESSED
LOCAL AFFECTED POPULATIION EVACUATED
ARRANGEMENT FOR FOOD AND OTHER ESSENTIAL FACILITIES
NO
WELL SUBDUED
YES
BLOW OUT OVER
INHABITATNS BROUGHT BACK TO THEIR HOUSES

ANNEXURE - II


CONTROL OF WELL
①
Subsea BOP not working
Subsea BOP working
②
Pumping mud
③
Surface BOP not working
Surface BOP working
Blowout problem
Mud cannot be used
Mud can be used
Wrong mud
Right mud
Lose pressure
Regain pressure
④
Prevent fire and explosion
Spray water on rig
Spray chemical dispersants around rig
Ship available
Ship unavailable
Loss of rig from fire
Spray working
Spray not working
⑤
Rescue personnel from rig
Ship available
Ship unavailable
Time for rescue
No time
Loss of personnel
⑥
Shutdown of other wells
In field
On rig
BOPs work
⑦
Capping of well
Cap not working
Cap working
Call in outside experts
Barge available/unavailable
Cap not working
Cap working
Pumping mud
⑧
Drill relief well
Dril unavailable
Dril available
Tow ship unavailable
Tow ship available
Drill not working
Drill in place and working
Burnout of oil and gas

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GRADES: AVICEL PH 101, AVICEL PH 102, RC 581/591
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CARNAUBA WAX / CANDELILLA WAX
TITANIUM DIOXIDE ANATASE / PHARMA U.S.P.

CELLULOSE ACETATE PHTHALATE USP (CAP)
HYDROXY ETHYL CELLULOSE "NATRASOL" LR/GR
SODIUM STARCH GLYCOLATE "PRIMOJEL"
MAGNESIUM ALUMINIUM SILICATE NF "VEE GUM /
VEE GUM HV / VEE GUM F"
HPMC -- COLOUR LAKE READY MIX FOR TABLET COATING IN AQUEOUS/NON-AQUEOUS BASE "LUMI-NO-DIS"

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Case study of a sick SSI chemical project*

overnment of India has recently, once again, reaffirmed etermination to promote and strengthen small scale indu- l units in the country. The Government is viewing the ll scale industrial sector as an ideal system to promote epreneurial opportunities to everyone, avoid concentra- of wealth and promote an egalitarian society. Unfortu- ly, contrary to Government's expectations and in spite ie support extended by it, a number of small scale units, icularly in the field of chemical industries have fallen sick remain closed hopelessly.

he number of measures extended by the Government to mote SSI units include the reservation of products for the lusive manufacture in SSI sector, liberal debt equity ratio financial assistance, preference in Government purcha- etc. The Government has also made it's intentions clear, urther help and strengthen the small scale units in every sible way. The causes for the sickness of SSI chemical ts, in spite of such support from the Government, certainly erve careful study.

The following case study of a sick chemical unit in SSI tor may help us in assessing the causes for sickness in I sector a little more clearly. The details of the progress the project from the concept to the commissioning and erational stage are described below step by step.

trepreneur

The entrepreneur of the unit is a post graduate in chem- y and he has served in a leading public sector chemical ject for around 11 years in the marketing department.

otivation

The entrepreneur's wife is a successful medical practioner another place, who would not like to leave the practice. erfore, the entrepreneur decided that he would leave the esent job and take up another job in the place where his fe was serving. In spite of his best efforts, he could not a suitable job in that place and therefore he decided to up his own unit to stay with his wife and to keep himself cupied at the same time.

oice of project

He decided to put up a chemical project, in view of his alification. He further thought that he should choose a pro- t exclusively reserved for manufacture in SSI sector by vernment, to avoid unhealthy competition from the bigger units. Considering his investment capability of Rs. 5 lakhs, he chose a bulk drug project costing Rs. 20 lakhs. The decision on the particular bulk drug was taken by him on the basis of the commercial project profiles available for sale in the market and widely advertised in the press.

Technical know-how

The entrepreneur went around searching for suitable source of technology for the project. He could receive offers to provide technology from various sources including consultant organisations, retired individuals, persons working in other organisations who would provide know-how on part time basis and without the knowledge of their employers etc. He could not get offers from organisations who have put up similar units earlier and he did not want to bank on individuals who would give no meaningful guarantees and who would not have multidisciplinary experience.

Finally, he decided to accept the offer of technology from an engineering consultant organisation, who had no prior experience in putting up the particular bulk drug project; but who nevertheless, offered to demonstrate the know-how in lab scale to the entrepreneur, after receiving the firm order.

Preparation of detailed project report

The entrepreneur sought the services of several consultant organisations to conduct a market survey for the product, to determine the economic capacity of the unit and to prepare the Detailed Project Report for the project. Whereas the proposed project cost was Rs. 20 lakhs, the established organisations demanded as much as Rs. 50,000 for preparing the DPR. Against such quotes, a number of individual consultants offered to prepare the DPR for a fee of Rs. 5,000 and even less. Totally confused between such offers and with determination to keep the pre-operative expenses low, the entrepreneur decided to prepare the DPR himself with the assistance of his chartered accountant who had adequate contacts with the financial institutions.

To establish the demand potentials for the product, the financial institutions insisted that firm marketing tie-up letters should be produced, which his Chartered Accountant could do without difficulty. The project cost and raw material/utility consumption levels were reproduced from the commercial profiles available in the market. Details of such consumption norms and precise project cost could not be obtained from the know-how supplier, since they would provide the same only after placement of order along with the advance. The entrepreneur could not place such an order before getting term loan sanction from the financial institution.

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o be read with article by the author titled "Sickness in Small & Medium
Chemical Weekly, 18.9.90 p.109.

Entrepreneur and the project cost

While preparing the DPR, the entrepreneur was advised that he should boost the cost of the project, to ensure that his capital contribution for the project would be brought down! Accordingly, the entrepreneur asked for and received boosted quotations for civil and electrical work as well as the supply of machinery from the favoured contractors. Such contractors agreed that the additionally boosted figure amount would be returned to the entrepreneur. Thus the project cost which should have been Rs. 20 lakhs became Rs. 25 lakhs, the loan amount from the financial institution was increased and the entrepreneur took his "Cuts" and saved the promoter's contribution for the project.

Sanction of term loan

The State Financing Institution took around 2 months to start processing the application for term loan. The various discussions, queries and clarifications took another 3 months and finally the in principle loan sanction was given after 7 months from the date of application. A number of conditions were imposed along with the sanction letter, like the requirement of personal guarantee, hypothecation of personal properties and no objection letters from a few quarters. The entrepreneur hesitated for some time and finally agreed for the conditions, as there was no other way out. Finally, when the entrepreneur completed the documentation and drew the first instalment of term loan, it was one year from the date of original application to the financing institution.

Meanwhile, to save time, the entrepreneur approached the scheduled bank for working capital assistance for the project; but the bank said that it could take up the application for working capital assistance, only after the financing institution would sanction the term loan for the project. The processing of the working capital application commenced after the sanction of term loan and it took 6 months for the bank to sanction, in principle, the working capital loan, after imposing several conditions like personal guarantee etc.

Under the circumstances, the entrepreneur commenced the construction of the factory even without any arrangement for the working capital finance for the project. Finally, when the working capital loan was sanctioned, the bank drastically reduced the working capital requirement for the project from the original figures in the application, on various counts. As the entrepreneur was already half way through the project construction, he was virtually at the mercy of the bank. The bank explained that it would sanction more working capital loan, after studying the requirement of the project while it would be in operation. The entrepreneur meekly accepted the bank's arguments and went ahead and completed construction of the project. While sanctioning the working capital loan, the bank insisted, indirectly, that the entrepreneur should bri certain amount of deposits to the bank. The entrepreneur tri at several sources and finally got hold of an Agent, w brought what was termed as "NRI deposits" to the bank a the entrepreneur paid 2% of the deposit amount as commi sion to the agent for bringing the deposit to the bank.

Transfer of Technology

The consultant organisation carried out the design a detailed engineering function of the project, without fulfi ing it's commitments to demonstrate the know-how on la scale to the entrepreneur. The consultant carried out the desig of the plant on the basis of the data available in literatur discussions with the experts in the field and its own kno ledge and experience with regard to the chemical enginee ing unit operations. Entrepreneur went on insisting know-how demonstration even as the plant design and co struction was being carried out, without positive action fro the consultant, who was confident about its capabilities.

Finally, when the plant erection was about to be complete the project engineer of the consultant organisation who wa dealing with the project resigned and left the job and a ne project engineer took over his place. The commissioning the project was carried out by this new project engineer, wh was not associated with the plant design earlier.

Trial run

When the mechanical commissioning of the plant was ca ried out, there was serious problems in the mechanical se of the autoclave and in the chilling plant. The suppliers the machineries took around 4 weeks to set right the prob lem but it was recurring during operations. Arguments too place between the machinery supplier and the entreprene about the quality of supply of the machinery versus the qua ity of operation by the entrepreneur. The consultant, wh inspected the equipment before delivery was functioning lik a mediator for whatever reasons. Entrepreneur could not als take a tough stand, since he was the recepient of the "cuts from the machinery supplier. Finally, the plant was com missioned with the equipment that was not functioning to th optimum level.

Manpower recruitment

The entrepreneur felt that the unit operations in the pro cess would be of routine nature and anyone could operat them, after a little training. He also felt that his unit coul not afford high level of salaries to operating personne Further, his own chemistry background made him feel con fident that he could run the plant on his own. Therefore, h recruited a number of untrained chemistry graduates an nnicians at comparatively low salary levels. As a measure caution, he retained the services of an experienced chem- and mechanical foreman on part-time basis to help him in case of difficulties.

oblems before commissioning

The project was completed and was ready for commission- two and half years from the date of conceiving of the oject by the entrepreneur. Several factors had undergone gnificant changes during the period, including the prices the raw materials and finished product, demand-supply sit- tion in the market etc. The cost of the project has also gone from the original estimates, with pre-operative expenses ing considerably more than the original estimated figure.

The working capital sanctioned by the bank was on the asis of 30 days credit period for sale, whereas the actual redit period in the market was not less than 60 days.

With such problems and inadequate conditions of the crit- cal plant and machinery, know-how that is yet to be proven nd with staffs that are not trained, the tired and exhausted ntrepreneur set out to commission the plant.

lant commissioning and disaster

The entrepreneur commissioned the plant with the help of he consultant. Against the stipulated process efficiency of 4%, the trial commissioning could provide only 76% efficiency. Repetition of the batches three times and parallel aboratory trial runs convinced the consultant and the entrep- reneur that the plant required modifications in certain areas. After the trial commissioning, the entrepreneur was in no doubt that by spending another Rs. 2 lakhs in plant modifications, the unit would work satisfactorily.

The entrepreneur could not bring this amount on his own and therefore he approached the financial institution once again. The institution sanctioned the additional finance after considering the request over a period of 6 months.

Meanwhile, the entrepreneur obtained the loan from a private financer by paying exhorbitant interest of 36%. The unit was set right and quality product was produced at adequate process efficiency levels.

During the trial runs, considerable portion of the working capital funds was eaten away in the production of products at low efficiency level. When the entrepreneur became confident of operating the plant satisfactorily, the banks lost the confidence in the entrepreneur and refused to sanction additional working capital facilities, that were urgently required to stabilise the operations. Therefore, the entrepreneur approached the traders for working capital needs. The eager and clever traders extended the loan and obtained the product at cost price.

The disspirited entrepreneur, made to run from pillar to post, was totally perplexed at the situation and at the rising interest burden every day. He refused to pay the retention money to the consultant, who quietly walked away. The unit helplessly came to a closure, with the entrepreneur feeling that every one has let him down and the financial institutions preparing advertisement text to the newspapers for the sale of the unit.

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Safety in Chemical Production, Part and Parcel of Entrepreneurial Responsibility

Dr. ANDRES F. LEUENBERGER

The First IUPAC workshop on "Safety in Chemical Production" was held in Basel, Switzerland between September 9-13, 1990. Attended by stalwarts in the World Chemical Industry, the workshop provided a forum to review safety procedures adopted in leading companies of the world.

In his address, partly reproduced below, Dr. A.F. Leuenberger, Vice-Chairman, Hoffmann La Roche Inc., stressed the responsibility of entreprenuers in providing innovative products with risks under control, and with environmental considerations built into a corporate policy. The importance of the theme to the Indian context hardly needs elaboration.

Environmental protection does not -- or not yet -- hold universal importance as a goal. There are a large number of current examples to prove this e.g. in East European states, where in certain respects attitudes have remained stuck in the Nineteenth Century. So, environmental protection is an important, but not a traditional goal of industry.

Rather, in the last few years environmental protection has been showing up in the platforms of political parties. Nevertheless, most research-based companies have always taken their responsibilities in this area according to the progress of knowledge. These efforts, however, arise not only from the responsibility a corporation feels towards its employees, the local population and the environment; they are also part of economic considerations which are not limited to a short-term thinking. The integration of safety ecology into corporate policy is a rational process. It helps to ensure the qualitative growth of the organization and thus bring about the achievement of its goals.

The responsibility of the businessman — in fact a compulsory counterpart of his freedom of action — is much broader and no doubt much more enduring than a set of relatively short-term goals. Correctly interpreted entrepreneurial freedom always presupposes acceptance of responsibility for one's own behaviour. On the one hand this includes the duty owed to shareholders because of their capital investment. On the other hand it includes also reponsibility for employees' personal safety and job security, responsibility for ensuring an innovative product range and the duty, with respect to our environment, to keep all safety risks well under control. Responsible behaviour of course presupposes strategic thinking aimed at developing and maintaining long-term competitiveness and profit levels.

Safety and environmental consciousness on the part of the corporate manager are therefore a natural part of overall corporate planning. Only by including all relevant factors an considering all possible options can we achieve optimu safety and environmental protection with due heed to marke realities. By exploiting modern technology and the possibilities now available for early risk identification to the full industry is able to act even more quickly and effectively tha legislation and regulatory limits require.

This does not mean that industry can constantly achiev the latest technical standards. Investments of some millio Swiss francs in order to prevent — for exemple — air pollution have to be planned carefully. The best available technology has to be evaluated and applied. This process need time. And therefore, in legislation on environmental protection there is a need of constancy in standards and pollutio targets. Any kind of moving targets must be rejected. At th moment of the investment decision, however, industry show more flexibility. There are many examples in Swiss industr where new investments for safety and for environmental protection not only reached the actual governmental targets bu using the available technology even went beyond.

Responsible corporate behaviour is not or not only idealism. By promoting a durable competitive edge, long-term profits, and sustained corporate health, responsible conduct serve self-interested ends. I am also not forgetting the ethica responsibility of the employer. But it follows from this economic conviction that safety and environmental considerations must be built into corporate policy. The integration o responsible corporate behaviour finally into all the activitie of our employees is the most effective for minimizing risk for the better use of natural resources.

Responsibility and responsible conduct cannot be expecte of the private sector unless the community grants it a measure of autonomy. Without freedom of action, corporate obligations cannot begin to be discharged, opportunites canno be seized. By that I do not mean to reject the need for government regulations. Effective government controls are needed in precisely those areas where market forces fail. So far as possible however government controls should be in line with free-market mechanisms.

The Swiss Chemicals Industry welcomes the joint establishment of national targets with the state. At the same time Swiss industry has to be allowed the greatest possible autonomy in the choice of the measures to achieve these targets.

Allow me to follow these general remarks by expanding on the notion of responsibility in the private sector. Responsibility, percepted as the complement of freedom of action, manifests itself among other characteristics in self-imposed guidelines. I have singled out three corporate duties for discussion:

— innovation
— safety
— and new technologies.

Innovation

Innovation is the task of identifying, developing and marketing products and services responding to the needs of today and of the future. This not only requires the establishment of tools within a company searching for novel products —for example the active screening of possibilities offered by the current state of knowledge and technologies. It also requires willingness to take risks, although, the launch of an innovative product to answer a human need has to be carried out in a responsible manner.

Anxious, unconsidered rejection of new technologies prevent any critical and factual assessment and is a reflection of an attitude which prefers to abstain from solving problems. This attitude can often be observed in spite of clear evidence that new knowledge and technologies and any resulting new products cannot be suppressed. It applies for example to the broad need to develop new pharmaceutical products to provide cures for those two thirds of all identified illnesses which even today remain incurable. Intensive research in the field of genetic information led to the development of gene technology. This for example opened the way to produce a large number of active substances using simple coli bacteria which we would not be able to produce by conventional processes. We still do not know for certain which of the hitherto incurable diseases will become treatable with the help of this new technology but in view of the tremendous opportunities offered we cannot afford an out-of-hand rejection of gene technology.

Anxiousness is only one of the reasons behind automatic rejection. It can also take place because of incorrect appreciation of the state of knowledge and misjudgement of intellectual capacities. The prudent approach is to form a critical opinion as to the potential risks. This should be done with a determination to find solutions to problems by means of open and factual discussions.

Safety

The IUPAC-Workshop has especially focussed on the safety aspects of production. This involves safety during manufacturing, storage, transport, use and final disposal. It is clearly evident, that in the whole chain of responsibility there are partners of industry as well. All of them, including the consumer, have to assume their share of responsibility.

A fine-tuned and internationally synchronized legal framework guaranteeing enough freedom of action can well serve as a basis for optimal safety in production, handling and disposal of new, innovative products. For the individual user it is essential to acquire the necessary knowledge for appropriate use and disposal.

We are talking primarily about chemical production during these days and the importance of safety in this area cannot be over emphasized. Entrepreneurship implies change. And change in chemical production must be implemented prudently with a wide ranging assessment which assures that safety is maintained in new or modified products, during the development, construction and start-up process, and in the routine manufacturing of our products. No operation is exempt and no employee is exempt from compliance with and support of safety.

Management's role is not limited to internal activities and efforts but also encompasses corporate responsibilities in the communities in which we live and work and in the physical environment where our products are used and our waste stream disposed. This responsibility includes proactive steps to assure physical safety as well as steps in education to support understanding. As our operations and products become scientifically more complex, the burden of explanation and communication lies with us. Our ability to convey facts and support understanding will assist the public in making informed judgements of product or technology risks and benefits.

Let me at this point comment briefly on what I see as the entrepreneurial opportunities in safety. Our safety experts, must be entrepreneurial and forward thinking. While you with deal the issues and responsibilities of the day, your most important contribution is in anticipation and prevention. It is your responsibility to provide the proper check and balance that assures that safety is an integral part of our proucts, designed into our plants and a priority component of ur education and training programs. This requires constant igilance and a longer term vision.

There can be no conflict between safety and entrepreneur- hip. The entrepreneur must always operate within the con- traints of prudent safety guidelines. On the other hand, our orporate safety experts must support the internal entrepre- neur in his search for new products, new processes and mproved efficiency with innovative solutions to the safety ssues which surface.

Democratic Society Confronted with New Technologies

In democracies, where individuals wield substantial political power, governmental institutions, citizens and industry have to find a common denominator for their interests.

Most established technologies usually find broad acceptance. The scenario is different for new technologies. Large segments of society approach them with substantial doubt and question marks. For the individual, information which enables a personal assessment is not available or is difficult to understand. Experts explaining the benefits and risks act at the same time as opinion moulders. For the businessman the life cycle and potential market penetration of a product or the impact of a technology have been scrutinized and after launch, market progress is only gradually reveiled. For the authorities it is difficult to appreciate the impact of an innovative technology. Even more demanding is the assessment of the influence of a new technology, where no tangible products or services have yet emerged.

We can only enjoy the benefits of innovation if we are willing to develop a common assessment of its impact. So it is important that society improves the way it handles novel products and new technologies. A top priority is open dissemination of what is known about the benefits and risks, which really reaches the consumer.

With regard to the legal framework, internationally well-harmonized legislation could serve to channel ongoing efforts in a desired direction. Scientifically based and internationally accepted standards are certainly a great support for harmonization. Therefore industry welcomes the efforts of non-governmental institutions like the International Union of Pure and Applied Chemistry (IUPAC) for their work in setting standards accepted all over the world.

Environmental Production and Safety in Chemical Production, Technical Aspects

In the last twenty years chemical industry made extensive investments in facicilities for environmental protection with visible success. In the Federal Republic of Germany f instance, industrial production has doubled in this period b emissions, arising from production, dropped by 60 to 90 pe cent. The share of the total air emissions caused by chemic production in this country is now as low as 3 percent.

How was this achieved? Chemical production has mainl seen the application of so called additive environmental pr tection. In other words, unwanted by-products are separate and eliminated. It will be rather difficult to abandon this pr cedure completely. The modern approach of integrated env ronmental protection is to use new production method suppressing the generation of unwanted by-products. Ne working hypotheses have to be formulated and their tech nical practicability must be examined in order to find approp riate methods of integrated environmental protection.

An example from polymer chemistry can serve as illustra tion. Polypropylene was usually obtained by polymerizatio in a volatile solvent. Minute amounts of the solvent can b detected in the waste air. An elimination of the residual quar tities of solvent would have been laborious and expensiv Complete removal has proved to be unattainable. Therefor additive environmental protection was not the answer. A ne process had to be found. The research target was to find nove catalysts able to induce polymerization without solvents.

Now, modern methods use special catalysts exactly fittin the specific requirements of polypropylene production i absence of a solvent. Searching for integrated environmenta protection means finding a tailor-made pathway for each syn thesis. There are no broadly applicable general solutions.

When we turn our attention to safety in chemical production a lot of questions could be addressed at and answered during this workshop. If I was asked to pick out one issue from the multitude of topics discussed, my choice would be Minimization of risks. On the technical level this goal can be approached by a systematic reduction of all risk factors including human mistakes. This can only be achieved by permanent and consequent safety education.

If we ask for enough freedom of action to take the necessary measures, we simultaneously set ourselves an extremely ambitious challenge. Society requires increasingly interdisciplinary thinking combining economical, technological and ecological considerations. Thus it is first up to us to formulate clear goals for each of these sectors and to achieve them. Prospective planning, early risk identification and taking the necessary measures, formulating goals and achieving them — this is our job. With a better and well-considered risk- management we can demonstrate that we are willing to take risks, but that we also are conscious of our responsibilities and that we accept them.

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News About New Projects

ICI INVESTS $ 193M IN UK ACRYLICS BUSINESS

ICI is to invest over £110m ($193m) in doubling its methyl methacrylate (MMA) manufacturing capacity on Teeside, UK. Over half of the cost will be dedicated to an acid waste recycling system to eliminate sea disposal.

Announcing the project — the company's largest single investment in the UK in the last ten years — Ralph Hodge, ICI Chemicals & Polymers chief executive designate, said it represented a "Major vote of confidence" in the Teesside operations and in a highly successsful acrylics business, for which MMA is a key intermediate. The investment further underlines ICI's commitment to environmental protection, he said.

The new investment will bring ICI's MMA capacity of Teesside to 200,000 ton/year. Capacity for methacrylic acid, an associated product used in paints and resins, will also be increased by 12,000 ton/year. Both the MMA plant and the acid recovery unit are expected to be commissioned during 1992, with full operation scheduled for early 1993.

The additional manufacturing plant, together with expanded MMA capacity in Taiwan of around 80,000 ton/year , is expected to take ICI from its current number three position in the world acrylics business, behind Rohm & Haas of the US and West Germany's Rohm, to equal second with Rohm.

Some £66m of the total investment is to be spent on the acid waste recovery and recycling plant which will enable the company to end river and sea disposal by early 1993 at the latest. The new plant will use technology licensed from Rhône-Poulenc and developed further by ICI. Sulphate will be recycled via sulphur dioxide and trioxide to sulphuric acid, and the ammonia converted to elemental nitrogen. The announcement supersedes earlier plans for an acid recycle unit solely to deal with the acid waste (3 ton for every 1 ton of MMA) from the existing 100,000 ton/year plant.

The company says it may look to license the process to other MMA producers. Most of the MMA produced on Teesside is transported to the company's downstream operations at Darwen, Lancashire, where it is transformed into a range of acrylics products. ICI's range includes Perspex sheet used for baths and signs, Diakon moulding powders for car tail lights, Auron composites, a marble lookalike for decorative and working surfaces, Asterite dispersions for bathroom and kitchenware and Modar resins used for car body panels.

The new MMA capacity is part of an overall strategy to develop the acrylics business. It builds on the recent acquisitions of KSH, an independent North American producer, and more recently Juraplex, a smaller concern based in southern France. Associated downstream investment at Darwen includes a new £19m, 8,000 ton/year Perspex plant, due onstream towards the end of this year, and a recently completed Asterite plant and three Auron lines.

The acrylics business is currently worth around £100m/year to ICI. Hodge estimates market growth averaging 5 per cent/year, with figures possibly topping 12 per cent/year in the Asia-Pacific region.

MMA production at the Taiwanese MMA plant, in which ICI holds a 60 per cent share, was closed down last year following protests from local environmentalists over sea disposal of waste acid.

The plant is currently producing the intermediate acetone cyanohydrin which is being toll converted elsewhere. The expanded plant, with associated acid recycle facility, is due onstream in th first quarter of next year.

B & RB WINS PHILLIPS hdPE REBUILD

Brown & Root Braun has bee awarded the construction contract f the initial stages of the rebuilding Phillips 66 Co's high density polyethylene (hdPE) capacity destroyed b explosion and fire last October. Th value has not been disclosed.

At the time of the explosion, whic destroyed all Phillips' hdPE capacity Houston, Texas, Brown & Root Brau was constructing a new 125,000 ton year hdPE unit at the site. Pla announced last November now call f that unit, undamaged by the fire, to b expanded to 273,000 ton/year. Completion of the initial 125,000 ton/yea capacity, originally scheduled for th June, has recently been put back October, when the full capacity wi come onstream.

Brown & Root Braun is also to buil a previously announced secon replacement unit, of 273,000 ton/yea capacity, by July 1991. Engineerin work for both units is being carried ou under a separate contract by M.W. Ke logg. The units will use Phillips' loo reactor technology. Phillips recentl sanctioned a third unit, also of 273,00 ton/year capacity, to restore its U capacity to the 818,000 ton/year it ha in place or under construction before th fire.

DSM/IDEMITSU CANCEL POLYCARBONATE JV

DSM and Idemitsu have disbande their Xantar polycarbonate joint ventu and cancelled plans to build a plant Delfzijl in the Netherlands. The decisio came one day ahead of a planned hea ing by the Dutch authorities of obje tions to the plant from environment groups. The plant, which would hav cost more than Dfl.350m ($187m), ha een billed by the companies as the cle-nest of its kind, but environmentalists rotested about emission of dichloro-ethane waste into the northern adden Sea.

The decision to cancel was taken on urely economic grounds, according to e companies. But a DSM spokesman onceded that escalating environmental osts and long delays in the licensing rocedures had "not made it any heaper". A recent study by the com-anies is said to have shown that the lant would have operated at a loss until e year 2000.

The market for polycarbonate ngineering plastic has not deteriorated gnificantly in recent months, but the ompanies declined to give further etails on the economic background to eir decision. The Dutch environment-ists said they hoped DSM would now ke time to develop a polycarbonate roduction process which does not pro-uce dichloromethane waste.

Both companies said they would con-nue to look for opportunities to expand the polycarbonate market. DSM, owever, may for now concentrate on rocessing polycarbonate produced by her companies, according to the pokesman.

C INVESTS IN JOHOR FATTY CID PLANT

The International Finance Corp (IFC) to invest $8.7m in Twenty-First Cen-ry Oleochemicals, a new company to set up in Johor, Malaysia, to produce range of fatty acids and glycerine from lm-based feedstock.

The projects involves construction of hydrolysis plant with a capacity to rocess 125 ton/day of palm kernel oil, lm fatty acid distillates and palm stea-n. Construction is set to begin this onth, with commercial production pected by the end of June next year. C will make an equity investment of $ 800,000 for 20 per cent of the shares in the new company, a subsidiary of palm oil refining operator, Twenty-First Century Oils. IFC will also provide the company with a loan of $7.9m. In a similar announcement last month, Akzo said its joint venture, Akzo & Pacific Oleochemicals, was investing $14.8m in a new fatty acids and glycerine plant at its existing manufacturing site on Jonor.

STATOIL BOARD APPROVES JV METHANOL PLANT

Statoil's board has approved the building of a methanol plant based on natural gas from the Heidrun oilfield on Halten-banken. The plant will be established as a joint venture between Statoil, Norske Conoco and Du Pont at an estimated cost of Nkr2.5bn ($392m). A decision on location will be taken this autumn.

The menthanol project represents Norway's first large-scale initiative to develop natural gas applications for its abundant gas reserves. Production will widen the range of Statoil's present petrochemical operations, providing a basis for future chemical/petrochemical upgrading investments.

Statoil will tentatively hold an 80 per cent share in the 830,000 ton/year plant, taking responsibility for marketing and sales. Norske Conoco will acquire a 20 per cent stake. Production will demand gas deliveries of around 750m cubic metres/year, on a scale to ensure efficient disposal of the Heidrun oilfield's gas output. The field is scheduled to come onstream by 1995.

Joint feasibility studies had earlier justified the building of a methanol plant on both technical and commercial grounds. Studies have identifid Trondheim as a suitable location.

Both Conoco and Du Pont later confirmed participation in the Statoil-led venture. Statoil says the proposed plant will supply between 15 and 20 per cent of Western Europe's methanol demand.

Statoil's board plans to announce its recommendations for a landfall point in mid-Norway during the autumn, including a site for the methanol plant. Norway's parliament, the Storting, will discuss the project in October. A separate feasibility study is taking place to determine the potential viability of a 500,000 ton/year methyl tertiary butyl ether (MTBE) plant using methanol feedstock and requiring 180,000-190,000 ton/year methanol and 460,000-480,000 ton/year of butane.

The plant would be wholly owned by Statoil and located outside Norway. A decision on this project and plants is anticipated by late autumn. Latest indicators suggest the plant will be built in Antwerp near North Sea Petrochemicals' 180,000 ton/year polypropylene plant which is due for start-up in September. NSP is a 50:50 joint venture between Statoil and Himont.

PNB REVERSES LUZON INVESTMENT DECISION

The state-owned Philippine National Bank (PNB) and the Philippine National Oil Company (PNOC) may invest in the controversial $370m Taiwan-backed petrochemical project in Batangas province, PNB president Edgardo Espiritu has said.

The Luzon Petrochemical project, in which Taiwan-based USI Far East has a 70 per cent stake, has been delayed by political in-fighting and charges last month by the then PNB chairman, Jokr Arroyo, that the project was mostly being financed with government loans. Arroyo has since left the bank, sacked shortly after making the accusations, according to local sources. USI has invested Peso 415m ($18.5m) in the project so far, even though construction has not yet begun. The project aims to set up a 250,000 ton/year ethylene cracker with downstram polyethylene and polypropylene units.

Biotechnology

GLAXO SPEEDS MIGRAINE DRUG APPLICATIONS

Glaxo has submitted the first product licence applications (PLAs) for its migrane treatment, sumatriptan, in the UK and US. Glaxo has gathered data on the drug's safety and efficacy based on research involving more than 6,000 patients in Europe and North America over three years, and collated this in an International Registration Dossier (IRD). The IRD, the core document containing data on clinical trials of both oral and subcutaneous injectable forms of the drug, provides the basis of these applications.

Glaxo has applied for both forms in the UK and the injectable form in the US. It plans to include the oral form in the application later in the year. Because of the long delays between application and receipt of regulatory approval, Glaxo has concentrated on submitting applications in an efficient manner. It aims to submit PLAs in most of the main pharmaceutical markets within the next few weeks. Previously, the process has taken a period of years. The only major market not covered is Japan, where Glaxo does not expect to submit a PLA before the second half of 1993.

Sumatriptan is a highly specific activator of 5HT-like receptors. It acts on cranial blood vessels to relieve migraine and cluster headache. Results from clinical trials of the drug have been impressive. Studies published at the International Headache Congress held in Sydney, Australia, last October suggested subcutaneous administration of an effective dose could relieve most symptoms of a migraine attack in 30 minutes, over 80 per cent within one hour, and virtually all within two hours. There was a considerable difference from the placebo group, without any evidence of unacceptable side-effects.

Oral forms of the drug are slower acting because of the time taken by them to be absorbed into the blood stream. However, despite the lower bio-availability, papers on oral sumatriptan show the drug relieves 67 per cent of migraine attacks within two hours, compared with relief in 22 per cent of cases with a placebo.

The incidence of migraine in the population is quite high — it is thought to affect 10 to 15 per cent of people. Current therapies have limited effect and some considerable side-effects, so some analysts have predicted sales potential nearing "blockbuster" status.

DU PONT OKAY FOR SOVIET DRUG

The first Soviet developed drug to be licensed and clinically tested by a US company has been approved by the FDA. Du Pont has been cleared to market Ethmozine (moricizine), an antiarrhythmic, for the treatment of ventricular arrhythmias (abnormal heart beats) that are judged to be life threatening.

The US is the first country in which Du Pont has been granted approval for Ethmozine, although it has been available in the USSR for over 17 years. Applications have been filed in a number of countries outside Eastern Europe, including the UK and France.

According to Du Pont, the drug has a pharmacological profile that differs significantly from other antiarrhythmics. In a 1,072 patient study, proarrhythmia, or drug induced abnormal heart beat, was observed in only 3.7 per cent of patients taking the drug. This is considerably lower than any other drug in this class, Du Pont claims. In addition, the drug is well tolerated, with discontinuation for all side effects found to be 9 per cent.

Ethmozine was evaluated in a National Institute of Health (NIH) sponsored comparative study, Cast (comparative arrhythmia suppression trial) According to Dr. Craig Pratt, the Cas principal investigator, the drug has the best risk-benefit ratio among first time antiarrythmics.

UPJOHN TARGETS THROMBOSIS CAUSE

Scientists at the Upjohn Company in Kalamazoo, Michigan, are investigating the role of the blood protein plasminogen activator inhibitor-1 (PAI-1) in the clotting mechanism of blood, with the aim of finding a link between high levels of this protein and thrombosis (clots). The work could eventually lead to preventative therapies for people identified as predisposed to thromobosis, which can lead to heart attacks.

Restrospective evidence from blood samples from heart attack sufferers shows elevated levels of PAI-1. The researchers wished to establish whether this was a cause or a consequence of heart attacks. In preliminary studies published in Nature, Dr. Lawrence Erickson and colleagues show that transgenic mice expressing the human gene for PAI-1 are predisposed to locked veins. The researchers used a mouse model in which the PAI system could be manipulated. In humans, the clotting of blood is determined by an equilibrium between the inhibitors and activators of plasminogen. The latter are substances that transform plasminogen, an inactive protein, into the enzyme plasmin that degrades the clot protein fibrin.

Erickson said he had established a possible causative link between elevated PAI-1 and thromboses in veins, but had found no evidence of thromboses in arteries. The team intends to continue the work to find the role of secondary factors, he added. If a causative link is fully established in humans, elevated levels of PAI-1 in blood could be used to identify people at risk from developing clots. Therapies to reduce the level of this substance might prevent heart attacks.

Environment

EC OFFERS PLACE IN EPA FOR E. EUROPEAN STATES

Countries in Eastern Europe, includng the USSR, are to participate in the European Environment Agency, which s being set up by the European Community. The decision was announced at a one-day meeting between EC environment ministers and their counterparts from Eastern Europe, held recently in participation by the Soviet Union in an EC organisation.

The environment ministers also decided to widen aid to Eastern Europe. Poland has to date received some £16m ($28m) under the EC's Phare (Poland-Hungary Action for Reconstruction of the Economy) programme. Hungary has received £18m. The programme is now to be extended into Bulgaria, East Germany, Yugoslavia and Czechoslovakia.

Poland's environment minister, Bronislaw Kaminski estimates that the country will need to make it more "environmentally benign".

The East European ministers have asked for help with training, information and technology, rather than simply cash injections, according to press reports.

A code of conduct is due to be published by the Commission covering environmental standards to be met by Western companies building plants in Eastern European countries. This is aimed at ensuring that companies do not take advantage of the relatively primitive environmental legislation in these markets.

By bringing these countries into the European Environment Agency, which looks set to be sited in Copenhagen or Madrid, it should be possible to improve on the environmental data currently available for Eastern Europe. A ministerial meeting in Brussels was expected to approve the extension of the EC's Phare programme to the four additional East European countries, East Germany, Bulgaria, Czechoslovakia and Yugoslavia.

The question of possible provision of support for USSR was also expected to be discussed. According to a Commission spokesman, the Commissioners "have not yet taken a position" on this issue. At present, the Community has commited Ecu250m ($300m), out of the total 1990 aid budget of Ecu300m, for aid to Poland and Hungary. A further Ecu200m are expected to be released before the end of the year for 1991.

STATE AID FOR ICI/ CIBA HERBICIDE R & D

A research project into environmentally friendly herbicides involving Ciba-Geigy Australia and ICI Kemrez Australia is to receive government support A$303 000 ($242 000) over the next three years. The two companies are collaborating with a number of research groups coordinated by Daratech, the trade arm of the department of agricultural and rural affairs in Victoria.

Under study are controlled release formulations of triazine herbicides. The aim is to develop novel, cost-effective formulations to minimize or even eliminate the potential for ground water pollution. It is hoped that the new products will be applied at a lower dosage rate than existing ones.

The government money has been awarded under the Grants for Industry Research and Development (Gird) scheme. Among four other grants recently announced are ones covering the development of collagen-based biomaterials suitable for new forms of vascular prostheses (Bionova Neotechnics/CSIRO biotech division) and zirconia-based ceramics with increased mechanical reliabilty (ICI/CSIRO, Sydney University, ANSTO). In all, the five projects will receive A$1.8m aid through Gird.

MEDIPOLAR ASKED FOR CLEAN-UP DETAILS

Finland's state-controlled Environment Supervisory Board (ESB) has asked Farmos' pharmaceutical unit, Medipolar, to submit a report outlining how it plans to deal with pollution of land and waterways adjacent to its production facility in northwest Finland.

Preliminary investigations, conducted by the ESB in cooperation with Medipolar, found sections of the company's Oulu Plant site to be "heavily contaminated" by polluting solvents. ESB studies reveal the present level of contamination to have occurred over two to three years. Onsite tests show that since 1985, 14 ton of organic solvents have leaked into the ground adjacent to plant storage units.

A series of more detailed reports initiated by Medipolar found that 8 ton of the leaked solvent had permeated the soil to a depth of 15-20m.

The other six ton of solvent are located above the water level and can easily be removed. Levels of up to 2,200 mg/litre ethanol, 1,400 mg/litre methanol and 830 mg/litre of methylenechloride, have been found. Medipolar is studying the options, which include the use of high-pressurized water pumps to extract solvents lodged above the water level.

AKZO TO INVEST $10m

Akzo is to invest $10m in a new Brazilian facility to produce diagnostic kits for pregnancy, Aids and hepatitis. The investment is being made through its Organon Teknika division and will enable at least 20 of the 50 products the company currently sells in Brazil to be made there. The unit should be operative by August 1991.

News from Japan

EAR SURVEY OF RTILIZER DISTRIBUTION ANNED: GOVT.

The Ministry of Agriculture, Forestry l Fisheries is scheduled to commence ring the fiscal year 3-year plan for rveying fertiliser distribution: it ereby intends to ensure steady supply the product and improve the distri- tion system concerned.

The ministry plans to commission rtilizer Economy Institute with a rvey of market prices for fertilizer in prefectures. Covered by the survey ill be a prefectural federation of agri- ltural co-operatives, a fertilizer holesaler, a multipurpose agricultural -operative and two fertilizer retailers l living or located in each prefecture.

In addition, the ministry also intends look into farmers' thinking with egard to buying of fertilizer and asking e abovementioned fertilizer interests bout the volume of fertilizers they andle, types of product and their mar- eting policies. The surveys concerned ill be commissioned to Japan Agricul- ral Extension & Development Asso- iation. The survey results thereby btained will be analyzed by scholars nd men having relevant experience.

The Provisional Measures Law Con- erning Fertilizer Price Stabilization as abolished at the end of June, 1989 nd fertilizer has been traded without ny legal restrictions since then. It is orecast that the form of fertilizer deal- ngs will be diversified, fertilizer pro- ucers will integrate their plants in a bid streamline their production activitites nd fertilizer prices will vary with local- y.

Japanese farmers have come to be ncreasingly interested in fertilizer cost midst changes in the agricultural sit- ation and the ministry feels it neces- ary to reform distribution systems for fertilizer in accordance with the changing circumstances surrounding domestic agriculture.

CHIYODA WINS SAUDI ORDER FOR LARGER FERTILIZER PLANTS

Chiyoda Corp. has received a £50-billion order from Saudi Arabian Fertilizers Co. (SAFCO) for construction of production facilities for ammonia (500,000 t/y) and urea (600,000 t/y)in A1 Jubail located on the Persian Gulf. They will be handed over to the Saudi Arabian Corporation at the end of 1992.

The international bidding concerned was conducted at the end of August was conducted at the end of August last year by five firms including Chiyoda as well as U.S. and Italian companies. Chiyoda received the letter of intent (L/I) from the corporation late in July.

Chiyoda and its Saudi Arabian subsidiary Chiyoda Petrostar have concluded a lump-sum contract with SAFCO with regard to designing of the manufacturing plants concerned, procurement of related equipment, construction and trading of the operators of the new plants.

Relevant manufacturing process will be licensed by Topsoe (Denmark; ammonia synthesis), Stamicarbon (Netherlands; urea synthesis) and Hydroagrieurope — Licensing & Engineering (Netherlands; urea granulation).

Chiyoda informally won early this year a Bangladesh order for ammonia-/urea plants having nearly the same production capacities as those of the abovementioned plants.

SUMITOMO CORP. PURCHASE BRITISH AGROCHEMICAL COMPANY

Sumitomo Corp. recently acquired the total shares of Pan Britannica Industries, Ltd. (abbreviated PBA; Chairman and Managing Director, D. G. Hessayon), a British agricultural-chemical company. PBI is a subsidiary of Tennants Consolidated Ltd. of Britain. The contract for the purchase of the PBI shares was concluded with the parent company. PBI holds a share of 4% in the field of agriculture and that of 20% in the field of horticulture.

Sumitomo Corp., which has been exporting agrochemicals to the Near and Middle East, Africa and East Europe during the past 10 years, has been entrusting the formulation of the chemicals to PBI.

Sumitomo Corp. will take over the management headed by Chairman Hessayon and all the employees. It is thought that the purchase price is nearly equal to the annual sales of PBI, or 30 million pounds.

MITSUBISHI KASEI'S NEW SUBSIDIARY TO ADD 50,000-t/y POLYSTYRENE

Mitsubishi Kasei Polytec Co., Mitsubishi Kasei's new wholly owned subsidiary, will construct a 50,000-t/y high-impact polystyrene (HIPS) plant in Yokkaichi by the end of 1991. The new firm was established this July when Mitsubishi Kasei completely took over its joint venture — Mitsubishi Monsanto Chemical Co. — shared 51 and 49%, respectively, by itself and Monsanto Company of the U.S. The joint firm suffered from poor business due to a supply shortage of material styrene monomer and quality problems.

The plant is to be built by scrapping and building part of Mitsubishi Monsanto's old polystyrene facilities, whose capacity totalled 160,000 t/y. When the new plant is completed, Mitsubishi Kasei Polytec's PS capacity will be 200,000 t/y in total, the 2nd-largest in Japan next to Asahi Chemical Industry Company.

The plant construction will cost about ¥5 billion. For it, Mitsubishi Kasei's inhouse-developed technology will be adopted for the first time, whereas the old Mitsubishi Monsanto plant uses Monsanto's technology. HIPS produced at the new plant will be superior to conventional product in glossiness, and flame and shock resistance. Concerning the supply of material styrene monomer which will be critical for the polystyrene operation, Mitsubishi Kasei intends to work out a measure to ensure stable supply of the material to its subsidiary.

ASAHI GLASS OBTAINS CHILEAN SALT IMPORT CONTRACT

Asahi Glass Co. has concluded a deal covering this and next year for the importation of 235,000 tons of Chilean rock salt through Toyo Menka Kaisha (Tomen). According to the contract concerned, 40,000 tonnes will be imported this fall, and 65,000 tons each will be imported three times during next year. Chile is attracting attention as the 3rd-largest source of material salt supply after Mexico and Australia. The Japanese company has carried out test importation, and tested the quality involved by using soda ash and electrolytic soda equipment. As a result, it found that the purity is as high as 9.6%. The only remaining problem was the price of the material salt. Thanks to progress in infrastructure improvement, it became possible to import a little more than 65,000 tons per lot. As a result, Asahi Glass was able to conclude a contract for importation in quantity. It is expected that the signing of a contract with Chile will exert a big influence on the negotiations with Mexico and Australia on salt importation.

As part of its efforts for diversification of supply sources for material salt. Asahi Glass imported 40,000 tons of Chilean rock salt tentatively in April this year. It used the imported Chilean rock salt, on an experimental basis, f production of electrolytic soda and so ash at its Chiba and Kashima plants. A a result, it confirmed that the purity o the Chilean salt is higher than that o exican or Australian salt, and that th productivity of the Chilean salt, too, i very high. The only remaining problem was the import price. It was indispens able to cut the production cost by mean of transportation of large lots. So, Asah Glass was waiting for the improvemen of the infrastructure on the Chilean side

With consideration for the results o the experimental use by Asahi Glass Japan Soda Industry Association i scheduled to send a survey mission t Chile at the beginning of September and begin to study the possibility o importation on the level of the soda industry as a whole. Asahi Glass has concluded a large-scale import contract through Tomen, on the basis of the results of the test it had conducted independently. This year, infrastructure improvement in Chile, which improvement was originally scheduled for August, is expected to be postponed until December. So, the amount of importation during this autumn will not exceed 40,000 tons. Next year, however, importation will be carried out three separate times in large lots of 65,000 tons per ship. So, the total amount of the imports concerned will be 235,000 tons.

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SYN. DYES SUPPLY QUITE TIGHT IN YELLOW, BROWN COLOR ITEMS

Demand for synthetic dyestuffs has been on a high-growth path over the last few years, bolstered by healthy domestic business. Thanks to the continuing dark-colour orientation of the public and upswing of the domestic dyeing and finishing market, all items including major groups of reactive and disperse dye stuffs are enjoying stable market growth. As such, in this expansive market phase supply is quite tight especially in yellow and brown products.

New Developments from Japan

UGHER CC COMPOSITE ODUCED USING FIBER- DIS- RSED PROCESS

ippon Steel Chemical Co., together Nippon Steel Corp., has developed -performance carbon carbon-fiber) composite using a unique fiber- ersing process designed to entangle rt carbon fibers with each other on -dimensional basis.

he new product's interlaminar shear ngth and tensile strength are more 1.5 and 3 times higher, respec- ly, than those of conventional-type composite, which is produced by inating prepreg (carbon fiber impre- ated with synthetic resin), combin- it with synthetic fiber and carbon baking the resultant product. The nventional product has drawback that res are often produced between pre- g laminates, and the product itself is ereby broken.

Nippon Steel Chemical has test- nufactured bolts and nuts from the w product: they are applied to high- nperature furnaces. The company ns to exploit markets for the product the strength of small-sized manufac- ring/processing plants located at its bata factory. Tohoku Kyowa Carbon longing to the Nippon Steel group is heduled to mass-produce the new CC mposite in one or two years.

CC composite has thermal/chemical sistance, dimensional stability, self- bricating properties and thermal/elec- cal conductivity and has been nployed as structural-use parts for dustrial machinery. Its potential appli- tions are high-tech fields involving rcraft and space developement.

IGH-PURITY COBALT BORON ASS-PRODUCED

Nippon Denko Co., has begun to ass-produce high-purity (99.9%) cobalt boron used as a matrix for cobalt-based amorphous alloy, demand for which is expanding for use in transformers, magnetic heads and electromagnetic shielding material all for OA equipment.

The company is capable of commercializing the product at low cost using an inhouse-developed refining process.

Cobalt-based amorphous alloy is produced by adding niobium, zirconium, titanium or other elemental metals to the high-purity cobalt boron depending on application and quickly quenching the resultant product so as to reduce its temperature at the rate of more than 1,000,000 °C/sec.

GENENTECH MODIFIES PATENT APPLICATIONS FOR TPA

Genentech, Inc. (U.S.) has filed with Japan's Patent Agency a modified patent application for tissue plasminogen activator (TPA) produced using recombinant DNA technology: the product will be employed as a blood-clot dissolver.

The U.S. firm previously applied for a related patent but 19 private businesses and nine individuals both at home and abroad, protested the patent applications, which was finally rejected by the Patent Agency on the grounds that Genentech's claim included TPA containing amino-acid arrangements, which had yet to be clarified by the company itself. The Patent Agency has, however, approved a potential patent on mass production of a recombinant TPA.

Genentech has modified the patent application by specifying the said amino-acid arrangements of TPA. It expects the legal step to benefit its suit at the Osaka District Court against the alleged infringement of its patent of TPA by Toyobo and Sumitomo Pharmaceuticals. It has submitted related documents to the district court and asked for an early conclusion of the lawsuit.

SHAPE-MEMORY POLYVINYL-ALCOHOL HYDROGEL USABLE AS BIOMATERIAL

A research group at Shinshu University has developed shape-memory polyvinyl-alcohol (PVA) hydrogel usable as biocompatible material and raw material for artificial internal organs. The new product has high elasticity, strong thermal resistance and a high water-absorbing ration.

The research group has obtained the hydrogel by freezing/thawing 10%-pure aqueous solution of saponified/refined PVA, crosslinked the hydrogel using glutaraldehyde in the presence of hydrochloric acid and boiled the chemically crosslinked hydrogel.

As a result, the hydrogel's intermolecular hydrogen bondings — physical crosslinking — were broken and the hydrogel was thus endowed with shape-memory properties.

The molten hydrogel obtained through the boiling process was lengthened, shrunken within methanol and immersed in water: it then recovered the original lengthened form and turned into high-elasticity hydrogel. It could regain its original shape even after being repeatedly lengthened and shrunken.

It was also confirmed that when the lengthened hydrogel was dipped in hot water, it instantly became just like the hydrogel obtained through the freezing thawing process and turned back to molten state when left in water.

When the molten hydrogel was dried, it became a transparent film, which did not become elastic as in the case with frozen/thawed gel when dipped in water. The film, however, regained elasticity after it was subjected to a boiling process, shrunken in alcohol and dipped in water.

In general, high-elasticity hydrogel obtained through freezing/thawing of an aqueous solution of PVA has excellent expanding/shrinking properties. Its potential applications are actuators, reinforcement for macromolecular electrolytic material having high elasticity and biocompatible material. It is, however, impossible to apply the product to a field requiring a heating process since it lacks thermal resistance as result of having intermolecular hydrogen bondings.

SOLVENT-FREE, FLUORORESIN PAINT BAKED AT LOW TEMPERATURE

Nippon Oil & Co. and Asahi Glass Co. have succeeded in putting into practical use solvent-free thermosetting powder paint based on low melting point (100 £ C) fluororesin, which is produced using the solution-polymerization process. The paint can be coated on targeted material in the temperature range of 170 to 180 £C within 20-30 minutes. It is possible to form coating as thick as 50-60 microns at only one go. The product causes no environmental pollution and can be recycled and applied to an electrostatic-powder-coating system now in use. Asahi Glass, is scheduled to supply the raw-material resin to Nippon Oil & Fats, which will produce the paint therefrom and market it from October. Its annual sales five years hence are targeted at more than ¥8,000 million.

Potential applications of the product are siding material for buildings, sound-proof walls for roads and railroads, and bath tubs, etc. Nippon Oil & Fats also envisages applying the product to exterior panels for the car body and space equipment required to have resistance against ultraviolet rays. Fluororesin-based paint is being increasingly applied to buildings due to its strong weather/chemical resistance. Since the melting point c conventional-type fluororesin stands a 160-180°C, the said paint needs to b baked at high temperatures rangin from 230 to 250°C.

SUGAR-CHAIN-ENGINEERING R & D TO BE "ENCOURAGED" BY AGENCY

It seems that R & D on "sugar-chai engineering" considered to have grea potential in biotechnology fields will b "encouraged" by a government agenc involved in scientific development. A advisory body for Director General o Science and Technology Agency (STA has compiled a report entitled "Regarding encouragement measures for com prehensive R & D in terms of buildin up setups enabling the conducting o sugar-chain engineering" and presente it to the director. The report, expressin the background and significance of th growing recognition of the importanc attached to sugar-chain engineering pointed out the necessity of creating a new biotechnology area and its potential.

The panel offered measures in detai to help promote research and international co-operation as regards elucidation of biological function-adjustmen mechanisms on a sugar-chain level an urged the necessary preparatory steps t be taken immediately.

With the advice, STA intends t incorporate the presented ideas into it plicies starting next fiscal year t implement a project designed to encourage R & D for sugar-chain engineering

Sugar-chain engineering is related t research on substances of four group termed oligosaccharide, sugar protein glycolipid and proteoglycan which ar believed to have important roles i adjustment of the metabolic functions o the living body. The project is aimed a aiding scientists' efforts to elucidat their functions, and develop technica for analyzing and producing them.

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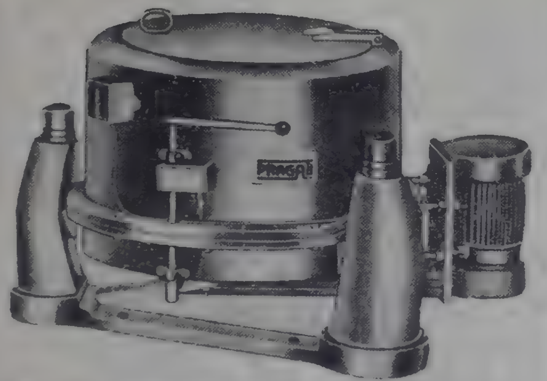

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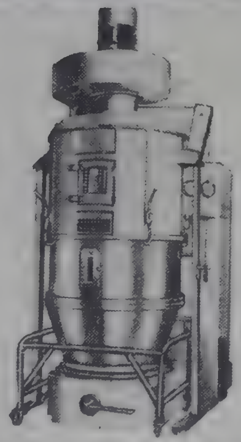

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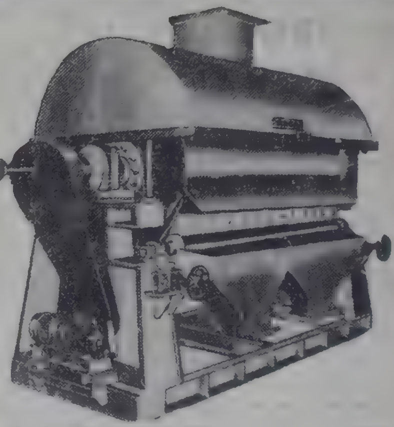

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* Ethyl Acetate

Plasticizers

* DOP (Di-2-Ethyl Hexyl Phthalate)
* DBP (Di Butyl Phthalate)
* BBP (Benzyl Butyl Phthalate)
* DEP (Di Ethyl Phthalate)
* Other Phthalates

Manufactured by

INDIAN ORGANIC CHEMICALS LIMITED

Mehta Mahal, 15, Mathew Road,
BOMBAY - 400 004.
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Tel: 8111428-8112529-8113420
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ETHYL CHLORO ACETATE (ECA)
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Manufactured by:

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Contact:

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Near St. Xavier College Corner, Navrangpura,
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Tel. No. 468991

85-C, Mittal Tower, Nariman Point,
Bombay 400 021.
Tel. No. 224636 / 232267

3B/6-7, Tirathram Building, Asaf Ali Road,
New Delhi 110 002.
Tel. No. 3262481

MARKET INFORMATION

Phthalic, titanium up

Prices of phthalic anhydride and titanium dioxide (rutile) firmed up by Rs. 6 and Rs. 7 respectively in the Bombay chemicals market during the week under review.

Supply of phthalic anhydride improved, however, on arrival of fresh inputs and offtake was good. Titanium dioxide firmed up on account of increased offtake by paint manufacturers. In the dyes section with poor supply from HOC saw the prices of most intermediates firming up slightly. The cut in allocations of naphtha may also affect prices.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent -- and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of the market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax. .

(Prices as on October 2, 1990)

INDUSTRIAL CHEMICALS	Per Kg.
Ammonium sulphate	2.50
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (Di)	14.50
Ammonium carbonate (Di)	17.00
Ammonium bicarbonate	6.00
Ammonium chloride	3.25
Ammonium nitrate	6.00
Arsenic white powder	22+ST
Acrylamide (Resale)	85.00
Barium carbonate	20.00
Bleaching powder (33% Cl)	5.00
Borax (Granular)	16.00
Borax (Powder)	22.00
Boric acid (Tech)	32.00
Bisphenol-A	75.00
Butyl carbitol	106.00
Caustic soda (Flakes)	11.00
Caustic soda (Solid)	12.00
Caustic soda (Lye)	10.00
Calcium chloride 70% (Solid)	3.25
Calcium chloride 75-80%(fused)	3.50
Calcium chloride 36% (Anhydrous)	5.00
Calcium carbonate (precipitated)	6.00
Calcium carbonate (Activated)	5.75
Cobalt oxide	550.00
Cresylic acid	62.00
Camphor (Indian)	105.00
Cream of Tartar (Tech.) China	70.00
Citric acid (Belgium) (Resale)	47.00
Citric acid (Indian) (Resale)	41.00
Copper sulphate	25.00
Chromic acid	66 00
Ethylene urea	58.00
Ferric chloride (Lumps)	9.00
Ferric chloride (Anhydrous)	20.00
Glue flakes	15.00
Glue sheets	6.75
Gohsenol GH-17	145.00
Hydro	45.00

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PARA CHLORO PHENOL
ORTHO CHLORO PHENOL
MONO CHLORO PHENOL
DICHLORO PHENE
SULFURYL CHLORIDE
E.D.T.A.
MONO CHLORO ACETIC ACID (MCA)
ISOPROPYL BROMIDE
CAUSTIC POTASH FLAKES
POTASSIUM CARBONATE
NORMAL BUTYL BROMIDE (NBBR)

Authorised Dealer of

M/s. Standard Alkali,
M/s. Anupam Rasayan,
M/s. Odex Chemicals Pvt. Ltd.,
M/s. P.K. Velu & Co. Pvt. Ltd.,

Please Contact:

Shree Amruta Organics Pvt. Ltd.

813, Raheja Centre, 214, Nariman Point, Bombay 400 021.
Phone: 240415, 243979, 2873680 Telex: 11 6053 SATC
4A-B, Trade Centre, Near Stadium House,
Ahmedabad 380 014.
Telephone: 462332

Hyflosupercell	30.00
Hexamine (Resale)	34.00
Industrial Wax	25.00
Litharge	40.00
Lead Acetate (Tech.)	39.00
Lithopone	32.00
Magnesium chloride (Crystal)	2.00
Menthol crystal (Flakes)	355+Ex+ST
Menthol bold	425+Ex+ST
Menthol crystal cold	395+Ex+ST
Magnesium carbonate (Japan)	30.00
Magnesium carbonate (Indian)	26.00
Maleic Anhydride (Resale)	42.00
Mercury (34.5 Kgs)	11,500.00
Nickel chloride	110.00
Oxalic acid (Resale)	14.00
Peppermint oil (Rectified)	188+Ex+ST
Potassium carbonate (Indian)	28.00
Potassium carbonate (Imported)	32.00
Potassium bichromate	38.00
Potassium phosphate (Mono)	34.00
Potassium phosphate (Di)	25.00
Polyvinyl alcohol (No. 117)	93.00
Polyvinyl alcohol (No. 173)	145.00
Polyvinyl alcohol (No. 208)	170.00
Paraformaldehyde (Resale)	20.50
Phthalic anhydride (Resale)	52.00
Pentaerythritol (Resale)	44.00
Paraffin wax	22+ST
Rangolite (German)	96+ST
Rangolite (Czech.)	72.00
Rangolite (China)	55.00 + S.T.
Sodium sulphate (Fine)	3.75
Sodium sulphate (Coarse)	3.50
Sodium sulphide 50-52% (Flakes)	11.50+ST
Sodium sulphide 58-60% (Flakes) (TCL)	25.00
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite (Resale) per 50 kg.	1,300.00
Sodium chlorite 80% (Spain)	100+ST
Soda Ash (Tata)	5.00
Soda Ash (Birla)	5.00
Soda Ash (Imp.)	5.00
Sodium bicarbonate	7.00
Sodium bisulphite	8.00
Sodium silicate	5.50
Sodium acetate	7.20
Sodium alginate	450.00
Titanium Dioxide (Anatase)	65.00
Titanium Dioxide (Rutile -- RCR_2)	95+ST
Tartaric acid	190.00
Trisodium phosphate	12.00
Thiourea	78.00
Urea (Tech.)	3.00
Vacuum salt	1.00
Zinc Dust	52.00
Zinc Oxide	58.00
Zinc chloride powder (Tech.)	20.50
Zinc sulphate	7.00

SOLVENTS	Per Kg.
Acetic Acid Glacial (Resale)	14.50
Acetic Anhydride (Resale)	35.00
Acetone (Resale)	24.00
Adipic Acid	90.00
Aceto Acetanilide	50.00
Aniline Oil (HOC)	48.00
Benzoate Plasticiser	62.00
Butyl Acrylate	85.00
Butyl stearate	38.00
Butanol	34.00
Benzyl Alcohol	60.00
Benzyl Chloride	34.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Bromine Liquid	68.00
Chloroform	30.00
Carbon Tetrachloride	20.00
Cellosolve	65.00
Cyclohexanone	64.00
Cyclohexanol	58+ST
Diacetone (Resale)	26.75
Diethyl Oxalate	34.00
Diethyl glycol (DEG) (Resale)	38.00
Dioctyl Phthalate	48.00
Diallyl Phthalate	42.00
Dimethyl Phthalate	28.00
Dioctyl Adipate	52.00
Dibutyl Adipate	42.00
Dipentene	15.00
Dimethylamine 40%	30.00
Dimethylamine 50%	35.00
Ethyl Acetate	22.50
Ethyl Acrylate	66.00
Ethylene Dichloride	19.50
Ethylene Glycol	35.00
Formic Acid (Imp.)	24.00
Formaldehyde (Resale)	6.50
Glycerine (CP)	48.00
Glycerine (IW)	55.00
Hydrogen Peroxide 50% (Resale)	39.00
Isopropyl Alcohol	40.00
Isobutyl Alcohol (Resale)	35.00
Monoethanolamine (Resale)	105.00
Melamine	60.00
Methyl Ethyl Ketone	42.00
Methyl Isobutyl Ketone	38.00
Methyl Acrylate	68.00
Methylene Dichloride (Resale)	20.00

For Your Requirements Of:

Di Octyl Phthalate (D.O.P.)
Di Butyl Phthalate (D.B.P.)
Di Butyl Maleate (D.B.M.)
Di Octyl Maleate (D.O.M.)
Di Octyl Adipate (D.O.A.)
Butyl Stearate

Please Contact Manufacturers:

SAVITA ORGANIC CHEMICAL INDUSTRIES

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PHEROMONES
CARDIAC GLYCOSIDES
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CAPROLACTAM
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OXALIC ACID
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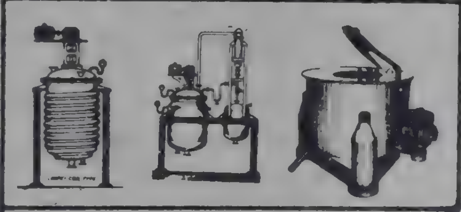

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Epichloro Hydrine
Ethylene Dichloride
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Hydroxylamine Sulphate
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Iso Butyl Alcohol
Iso Butyric Acid
Iso Propyl Alcohol
Lithium Hydroxide
Magnesium Oxide
Malonic Acid
Methyl Cellulose 4000
Methyl Cellosolve
Methyl Formate
Morpholine
Methyl Ethyl Ketone

N. Butyl Amine * N. Butyric Acid
N. Heptane * N. Propyl Amine
Quinoline * P.C.B.A.
Para formaldehyde 84-85%
Perchloro Ethylene
Petroleum Ether 40-60%, 60-80%, 60-95%
Secondary Butanol
Sodium Methoxide
Soya Lecithin Powder
Thiourea
Tri-Chloro Ethylene, T.E.G.
Tertiary Butyl Alcohol
Xanthone * Zinc dust

H.P.M.C. 5 CPS, 15CPS, 50CPS, 606 CPS

Please Contact: **Rajendra & Company**

Gopal House, 2nd Floor, 7/9, Kumbharwada Cross Lane, Veer Vithaldas Chandan Street, BOMBAY 400 003.
Phone: 321020/335736/344937 Residence: 6124644/6122149

Carbitol	75.00 + ST
Meta Cresol	45.00
Nitrobenzene	19.00
Nitric Acid (Conc.) (RCF)	2.50
Octanol	52.00
Ortho Cresol	30+ST
Phenol (Resale)	55.00
Propylene Glycol	52.00
Polyethylene Glycol (No.200)	75.00
Polyethylene Glycol (No.400)	80.00
Polyethylene Glycol (No.500)	52.00
Polyethylene Glycol (No.1600)	54.00
Polyethylene Glycol (No.4000)	95.00
Polyethylene Glycol (No.6000)	85.00
Para Cresol	120.00
Styrene Monomer	50.00
Sorbitol	14.00
Sulphuric Acid	2.80
Trichloroethylene	26.00
Triethanolamine (Resale)	95.00
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	20.00
Vinyl Acetate Monomer	55.00

SOLVENTS	Per Litre
Benzene	14.00
N-Heptane	10.50
N-Hexane	11.00
Methanol	9.25
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
Toluene	16.50
Xylene	28.00

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)

Alphanaphthylamine	64.00
Alpha Naphthol (Imp.)	160.00
Aceto Acetic Ester (Methyl)	73.00
Ammonium Molybdate	215.00
Anthraquinone	125.00
Anthranilic Acid	78.00
2-Amino 4-Nitrophenol	145.00
Blue B. Base (Local)	310.00
Beta Naphthol (Atul)	62.00
Benzidine Dihydrochloride (BDH)	76.00
Bromamine Acid	510.00
BON Acid (Incl. of excise)	140.00
Chicago Acid (Atul)	350.00
Coach Acid	52.00
C. Acid (Imp.)	200.00
Cyanuric Chloride	175.00
2,4- DNCB	27.00
Dihydrothio PTOS (Imp.)	1,600.00
Dimethyl Aniline	60.00
Diethyl Aniline	140.00
Diamino stilbene disulphonic acid	160.00
3,3-DCB (Imp.)	200.00
Gamma Acid (Atul)	200.00
H. Acid (Atul)	120.00
G. Salt	70.00
Isophthalic Acid	50.00
J. Acid	330.00
J. Acid Urea	440.00
K. Acid	110.00
MPDS (German)	200.00
MNA	
Meta Ureido Aniline	175.00
MPD (Local)	170.00
MPD (Japan)	185.00
Naphthenic Acid	46.00
N-Methyl J. Acid	500.00
N-Methyl Aniline	120.00
Naphthalene (Refined)	24.00
Ortho Anisidine (OA) (Imp.)	125.00
Ortho Dichloro Benzene (ODCB)	18.00
OT Base	125.00
Para Dichloro Benzene (PDCB)	30.00
Para Anisidine (PA local)	135.00
PNA	92.00
Para Cresidine (Imp.)	360.00
Para Amino Azo Benzene (India)	135.00
PNCB (HOC)	58.00
Para Amino Acetanilide	200.00
1-Phenyl 3-Methyl 5-Pyrazolone	135.00
Phenyl J. Acid	365.00
Para Amino Benzoic Acid	125.00
PT Base	130.00
Rhoduline Acid	520.00
Resist Salt 80%	20.00
Resorcinol	250.00
Sodium Naphthionate	65.00
5-Sulpho-Anthranilic Acid	85.00
Sulphanilic Acid	32.00
Sulpho Tobias Acid	145.00
Trichloro Benzene (TCB)	27.00
Tobias Acid (Imp.)	138.00
Metanilic Acid	42.00
MTD (German)	130.00

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Telex 021-7917 SBIL IN
Madras : Phone : 582046
Telex : 041-7527 SBIL IN

Bangalore : Phones: 570746-570760
Telex 0845-8275 SBIL IN
Hyderabad : Phones : 73737-831049
Poona : Phone: 50797

Plants at : Nandesari - Baroda; GIDC Ankleshwar; Boridra - Bharuch

Please Contact For Your Requirement Of:

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Bombay 400 034.
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Bombay Drugs Market

(Prices as on October 2, 1990)

Product	Rs./kg.	Product	Rs./kg.	Product	Rs./kg.
Acriflavine DPC	850.00	Diphenhydramine HCL	310.00	Morpholine	140.00
Aluminium Hydroxide IP	43.00	Disodium Hydrogen Citrate	43.00	Niacin	220.00
Ampicillin Trihydrate	1750.00	Ephedrine HCL	1900.00	Niacinamide	270.00
Aminophylline	335.00	Erythromycin Estolate	2250.00	Nifidipine	1750.00
Albendazole	2100.00	Erythromycin Stearate	2050	Nitrofurazole	280.00
Analgin	280.00	Ethambutol IP	900.00	Oxyphenbutazone	625.00
Aspirin IP	85.00	Ethophylline	650.00	Papaverine HCl	2000.00
Atenolol	2850.00	Ferrous Fumarate	38.00	Paracetamol	155.00
Benzoic Acid IP	34.00	Folic Acid IP	3200.00	Pectin IP	425.00
Bromine	65.00	Furosemide IP	2200.00	Pepsin 1:3000	375.00
Bromhexine HCL	2250	Furazolidone IP	400.00	Phenbarbitone	510.00
Butylated Hydroxy Toluene	650.00	Guanidine Nitrate	40.00	Pheniramine Maleate	1100.00
Caffeine Citrate IP	360.00	Gallic Acid	285.00	Phenyl Butazone USP	550.00
Caffeine IP	385.00	Haloperidone	19,000.00	Piperazine Citrate	95.00
Calcium Gluconate IP	45.00	Hematropine Methyl Bromide	12.00	Piperazine Hexahydrate	80.00
Calcium Glycerophosphate	160.00	Hydrazine Hydrate	80.00	Potato Starch	65.00
Calcium Lactate	40.00	Ibuprofen IP	370.00	Propanolol HCL	1700.00
Calcium Phenthonate	635.00	Indomethazine	825.00	Pseudoephedrine HCL	2200.00
Cetrimide IP	210.00	I.N.H.	280.00	Pyrazinamide	1325.00
Chloramphenicol Powder	1650.00	Inosite IP	900.00	Ranitidine	3100
Chlorbutol	95.00	Iodochloro	500.00	Rifampicin IP	3900.00
Chlorhexidine Gluconate 20% BP	225.00	Lactose IP	38.00	Saccharine Sodium	215.00
Chloroquin Phosphate	850.00	Lactic Acid	90.00	Salbutamol Sulphate	7300.00
Chlorpromazine HCL	1500.00	Levamisole	1500.00	Sodium Iodide	425.00
Choline Chloride FG	35.00	Lignocaine HCL	290.00	Sodium Methoxide	96.00
Choline Chloride IP	65.00	Lignocaine Base	325.00	Sorbitol Powder	115.00
Cloxacillin Sodium	2150.00	L. Lysine Feed	85.00	Sorbitol USP	13.00
Cimetidine	2050.00	L. Lysine Pharma	300.00	Sulphacetamide	300.00
Citric Acid IP	38.00	Magaldrate IP	40.00	Sulphamethoxazole	305.00
C.P. Maleate	1150.00	Magnesium Hydroxide	30.00	Tinidazole	375.00
Cyproheptadine Tcl	9500.00	Magnesium Trisilicate IP	11.00	Theophylline Anhydrous	390.00
Dexamethasone	95.00	Mannitol USP	102.00	Thiacetazone	275.00
Diazepam	800.00	Mebendazole	560.00	Tolbutamide	200.00
Dicyclomine Hcl	1500.00	Mercurochrome NF	280.00	Trimethoprim IP	980.00
Diethyl Carbamazine Citrate	300.00	Methyl Chloroformate	80.00	Vitamin A Palmitate	2600.00
Di-iodohydroxyquinoline	570.00	Metochlopromide TCL	1800.00	Vitamin B6 Hydrochloride	1400.00
Diloxanide Fumarate Ip	500.00	Metronidazole IP	415.00	Vitamin B2 5-Phosphate	4100.00

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Red HE 8B
Yellow HE 4G
Navy Blue HE 2R
Green HE 4B

(Export Enquiries Solicited)

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Cotton Khadi
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Fixer

Contact Manufacturers:

Shree Vinayak Industries

2, Violet-Villa, West Avenue Road, Santacruz (West), Bombay 400 054.
Phones: 540460, 6495100, 6461069

Bombay Dyes Market

(Prices as on October 2, 1990)

ACID COLOURS	Per Kg.
Acid Violet 4BS	*190.00
Acid Maroon V	110.00
Acid Orange II	112.55
Acid Orange IIY	93.85
Acid Red A	137.00
Acid Scarlet 3R	128.35
Acid Red 38N	*195.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Patent Blue AS	*280.00
Acid Green V	*375.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	157.15
Acid Black BX	126.95
Acid Black Wax	135.50
Crosein Scarlet MOO	200.30
Procinil Yellow GS (ICI, UK)	265.00
Procinil Red GS (ICI, UK)	530.00
Procinil Blue RS (ICI, UK)	315.00
Procinil Scarlet G (ICI, UK)	600.00
Procinil Orange G (ICI, UK)	250.00
Procinil Rubine (ICI, UK)	550.00

* To get resale price add 6% tax.

DIRECT COLOURS	Per Kg.
Yellow 3GX	114.00
Gun Yellow RCH	175.85
Fast Yellow GCH	171.50
Yellow CFG Hly. Conc.	721.00
Fast Yellow GS	126.96
Fast Yellow CHRS	116.85
Viscose Orange A	210.35
Fast Orange GR	171.50
Red	122.65
Dark Tan	98.15
Red IIR	98.15
Red 4B	217.55
Bordeaux BW	170.10
Fast Scarlet 4BS	223.50
Red 12B	220.45
Bordeaux Hly. Conc.	249.20
Cotton Red N	117.05
Brill. Fast Helio B	362.85
Brill. Fast Helio 2R	385.83
Brill. Fast Helio 2RS	177.30
Brill. Fast Helio BS	116.10
Brill. Violet Extra	181.45
Blue 2B	102.50
Blue G	220.45
Sky Blue FB	242.00
Copper Blue GR	190.25
Fast Greenish Blue GL	114.60
Developed Black BT	149.95
Blue NB-2B	348.45
Blue NB-2BG	214.70
Developed Black NB-GHB	214.70
Green B	142.75
Green NB-B	218.90
Green 2B-N	218.90
Brown MR	197.40
Brown CN	137.00
Golden Brown G	175.85
Catechin G	155.70
Omega Tan	161.45
Catechin GS	102.80
Black E Hly Conc.	180.15
Black E Extra Hly. Conc.	180.15
Black NB-ER Hly. Conc.	290.50

DISPERSOL COLOURS	Per Kg.
Red B 3B Conc.	611.50
Red B 2B Conc.	797.90
Red CB Powder	1048.25
Red D2B Powder	580.65
Violet C 4R	1202.70
Blue BG Powder	580.65
Blue BN Powder	128.25
Blue D 2R Powder	588.25
Navy BT Conc.	531.95
Blue B 2G Conc.	577.95
Blue BT Conc.	319.50
Blue BR	482.40
Yellow 7GL	813.20
Yellow 5RX	269.90
Yellow 3G	473.20
Yellow	140.00
Yellow AL	167.20
Yellow Brown REL	311.70
Yellow FFL	571.40
Gold Yellow GG	320.80
Pink REL	593.00
Red BEL	615.60
Red 2B	422.40
Red FB	425.80
Red Violet FBL	622.00
Orange 3R	254.20
Violet 3R	370.50
Violet RL	355.70
Violet 6R	638.20
Scarlet RR	283.50
Rubine 3B	289.10
Rubine CB	449.50
Blue GL	419.00
Blue BGF	805.80
Navy Blue RE	359.90
Brown 3REL	272.80
Black GEL	420.10
Dark Brown 3B	411.10

BASE COLOURS	Per Kg.
Fast Yellow GC	77.75
Fast Orange GC	128.40
Fast Scarlet R	198.05
Fast Scarlet RC	128.40
Fast Scarlet RCR	105.60
Fast Scarlet G	115.75
Fast Scarlet GN	92.95
Fast Scarlet GG	77.75
Fast Scarlet GGS	73.95
Fast Red B	233.50
Fast Red RC	115.75
Fast Red R Flakes	158.80
Fast Red TR	181.60
Fast Red TR Oil	223.35
Fast Red RL	251.20
Fast Red KB Oil	251.20
Fast Bordeaux GP	236.00
Fast Garnet GBC	103.05
Fast Violet B	548.80
Fast Blue BB	566.50

NAPHTHOL COLOURS	Per Kg.
ASG	301.85
AS	205.65
ASSW	379.10
ASBS	253.75
ASBO	266.40
ASD	209.45
ASOL	243.60

Delhi Market

DELHI: SEPTEMBER 27: NNS Following agitational approach adopted by the students against the Mandal Commission recommendations and observance of bandh and imposition of curfew in most of the Northern states, trading activities in the Delhi Chemicals remained market resticted during last week, says NNS. Sodium sulphate DCM Black and Red marka quoted higher by Rs. 400 at Rs. 4300 and Rs. 4500 per tonne in view of dwindling supply. Gwalior Rayon sodium sulphate also went up from Rs. 3650 to Rs. 4000. Tri sodium phosphate flared up by Rs. 75 at Rs. 675 due to suspension of supply line. Ammonia bicarb gained sharply by Rs. 30 at Rs. 210 per 25 kg. due to acute shortage of stock in the market. Soda bicarb hardened by Rs. 15 at Rs. 330/340 on account of tight stock and fall in supply. Likewise soda ash moved up by Rs. 2/5 at Rs. 365/375. In the absence of comfortable stock, boric acid technical rose from Rs. 1550 to Rs. 1600. Citric acid Chinese advanced by Rs. 30 at Rs. 1980 on higher Bombay advices, while citric acid Bombay Dyeing drifted lower at Rs. 2325 due to slack demand. In the absence of demand from local and outside consumers, paraffin wax tumbled down by Rs. 50 at Rs. 1150 per 50 kg. Match wax nosedived by Rs. 500 at Rs. 19,500 owing to pressure of offerings by the stockists in view of tight money conditions. Sodium nitrite suffered a setback of Rs. 100/250 at Rs. 1100/1250 due to heavy selling pressure. As a result of increased arrivals from U.P. and absence of demand from Pakistan and Afghanistan, menthol medium and bold dropped by Rs. 10 each at Rs. 290 and Rs. 310. Menthol flake moved down by Rs. 12 at Rs. 265. Chatkolite and safolite drifted lower by 50 paise at Rs. 55.50 and Rs. 58 in the absence of enquiries, while Rangolite Germany ruled quite at Rs. 95. In the absence of demand from plastic and paint units, titanium dioxide TTK and RC-922 declined by Re. one each at Rs. 63 and Rs. 87.

(DELHI MARKET RATES AS ON SEPTEMBER 27, 1990)

Ammonia Bicarb (Per 25 Kg.)	210.00
Mercury (Per flask)	11,100.00
Soda ash (Per bag)	365/375.00
Ammonium Chloride (50 Kg.)	140/180.00
Caustic soda flakes (50 Kg.)	525.00
Citric acid (Per 50 Kg.)	1,950/2,325.00
Stable Bleaching Powder Shriram (Per 25 Kg.)	101.00
Stable Bleaching Powder KCl (Per 25 Kg.)	90.00
Stable Bleaching Powder Maruti (Per 25 Kg.)	91.00
Stable Bleaching Powder Modi (Per 25 Kg.)	92.00
Sodium Bicarbonate (50 Kg.)	330/340 00
Sodium Hydrosulphite (Per Kg.)	43/46 00
Rangolite (Per Kg.)	95 00
Tartaric acid France (Per Kg.)	314.00
Sufolite (Per Kg.)	58.50
Chatkolite (Per Kg.)	56.00
DMO (per Kg.)	88.00
Boric acid Technical (Per 50 Kg.)	1,600.00
Paraffin Wax (Per 50 Kg.)	1,150.00
Slack wax (Per metric tonne)	13,500.00
Tartaric Acid (Swastik Per Kg.)	210.00
Borax Granular (Per 50 Kg.)	840.00
Borax Crystal (Per 50 Kg.)	850.00
Sodium Nitrite (Per 50 Kg.)	1,100/1,250.00
Sodium Nitrate (Per 50 Kg.)	500.00
Camphor Thal (Per Kg.)	110.00
Camphor Powder (Per Kg.)	96.00
Menthol Bold (Per Kg.)	310.00
Menthol Medium (Per Kg.)	290.00
Menthol Flake (Per Kg.)	265.00
Mentha Oil (Per Kg.)	180.00
Glycerine (Per Kg.)	53/58.00
Sodium Silicate (Per quintal)	300/400.00
Hexamine (Per Kg.)	34.00
Acetic Acid Glacial (Per Kg.)	14.25
Copper Sulphate (Per quintal)	2,400/2,600
Formic Acid (Per Kg.)	25.00
Formaldehyde (Per Kg.)	8.50
Hydrogen Peroxide (Per Kg.)	38.00
Calcium Carbonate (Per Tonne)	2,800/5,800
Acid Slurry Soft (Per Kg.)	27.00
Acid Slurry Hard (Per Kg.)	32.00
Phosphoric Acid (Per 50 Kg.)	1,235.00
Potassium Nitrate (Per quintal)	1,000/1,250.00
Potassium Permanganate (Per 50 Kg.)	2,600/3,000.00
Sodium Bichromate (Per 50 Kg.)	1,575/1,600.00
Trisodium Phosphate (50 Kg.)	675.00
Titanium Dioxide Anatase T.T.P. (Per Kg.)	63.00
Titanium Dioxide RC-822 (Per Kg.)	87.00
Titanium Dioxide Anatase K-Brand (Per Kg.)	59.00
Titanium Dioxide RCR-2 (Per Kg.)	88.00
Zinc Oxide (Per Kg.)	46.00/50.00
Phenol Carbolic Acid (Per Kg.)	39.00
Carbon Tetrachloride (Per Kg.)	24.75
Chloroform (Per Kg.)	28.00
Sodium Sulphate (Per metric tonne)	4,000/4,500.00
Naphthalene Balls (Per 50 Kg.)	1,370.00
Match Wax	19,500.00
Residue Wax	4,600.00

DYES & COLOURS	(Per Kg.)
Naphthol AS	175/211.50
Naphthol ASG	180/249.70
Naphthol ASBS	210/260.75
Naphthol ASTR	300/378.92
Naphthol ASOL	210/250.90
Naphthol ASBO	195/274.30

DIRECT DYES	(Per Kg.)
Black E. Conc.	120/185.30
Diazo Black B.T.	105/154.50
Green B	90/147.55
Blue 2-B	60/107.00
Blue 2-B 225% (JNR)	125.00
Sky Blue FB	160/248.20
Basic Auramine	55/110.00
Basic Rhodamine	300/425.00
Basic Methylene Blue	100/180.00
Basic Violet	165/210.00
Basic Malachite Green	175.00
Acid Orange	75/111.20
Congo Red H/C	75/120.95

Madras Market

An uncertainity prevailed in the arket. But a clear indication was hat all imported items are to cost ore since the overseas sellers ave put up their prices. Many of hem are not quoting due to the prevailing unclear conditions. Among solvents, prices of Acetone, Phenol Ethyl Acetate, DOP & DBP ruled high. While temporary dislocation in production at HOC, Cochin was attributed as a reason for the hike in prices of Acetone and Phenol, non availability of xylene and consequently Phthalic Anhydride were reasons for hike in DOP & DBP prices. There have been heavy enquiries for Toluene with no material coming to the market. Toluene prices are expected to go up.

CALCUTTA MARKET
(Prices as on Sep. 26, 1990)

Acetic acid (per 50 kg)	750.00
Basic chrome sulphate (per 50 kg)	800.00
Benzene (litre)	11.50
Bleaching powder (bag)	235.00
Borax granular (per 50 kg)	800.00
Boric acid (per 50 kg)	1,625.00
Camphor (per kg)	102.00
Caustic soda lye (per ton)	10,020.00
Caustic soda flakes (per 50 kg)	560.00
Glycerine (per kg)	53.50
Menthol bold (per kg)	570.00
Menthol medium (per kg)	380.00
Menthol small (per kg)	300.00
Phosphoric acid (per 50 kg)	1,400.00
Phenol (per kg)	38.50
Soda ash (75 kg)	395.00
Sodium bichromate (per 50 kg)	1,500.00
Sodium bicarbonate (per 50 kg)	340.00
Sodium nitrate (per 50 kg)	450.00
Sodium sulphate anhydrous (per 50 kg)	320.00
Sulphuric acid (per ton)	2,200.00
Trisodium phosphate (per 50 kg)	610.00
Toluene (litre)	16.50

(MADRAS MARKET RATES AS ON SEPTEMBER 29, 1990)

Acetic Acid Glacial (per kg)	16.00
Aluminium Sulphate Iron free (per MT)	4,000.00
Ammonium Bicarbonate (per 25 kgs)	165.00
Ammonium Chloride (per MT)	2,600.00
Acid Slurry (per kg)	31.50
Barium Carbonate (per kg)	9.50
Barium Chloride (per kg)	8.00
Boric Acid Technical (per kg)	28.00
Bleaching Powder (per 50 kgs)	220.00
Borax (per 50 kgs)	790.00
Caustic Soda Flakes – Mettur Chemicals (per MT)	11,300.00
Caustic Soda Flakes – Andhra Sugars (per MT)	11,300.00
Calcium Chloride 70% Solid (per MT)	3,500.00
Calcium Chloride Anhydrous (per MT)	6,000.00
Calcium Carbonate (Activated) (per MT)	6,500.00
Calcium Carbonate (Precipitated) (per MT)	5,600.00
Citric Acid (per kg)	48.00
Copper Sulphate (per kg)	24.00
Cresylic Acid 98-99% (per kg)	135.00
Pure Para Cresol 96% (per kg)	88.00
Meta Para Cresol 42% (per kg)	55.00
Formic Acid (per kg)	26.00
Formaldehyde (per kg)	8.00
Glue Flakes (per kg)	15.00
Glycerine I.W. (per kg)	49.00
Hydrosulphite of Soda (TCPL) (per kg)	42.00
Hydrosulphite of Soda (IDI) (per kg)	45.00
Hydrosulphite of Soda (BASF) (per kg)	47.00
Hexamine (per kg)	32.00
Hyflosupercell (per kg)	23.00
Hydrogen Peroxide (per kg)	38.00
Litharge (per kg)	38.00
Lead Acetate (per kg)	40.00
Magnesium Carbonate (per kg)	16.50
Magnesium Chloride (per kg)	3.75
Maleic Anhydride (per kg)	40.00
Menthol Crystals (per kg)	345.00
Oxalic Acid (per kg)	17.00
Paraffin Wax (per kg)	18.00
Potassium Bichromate (per kg)	36.00
Phosphoric Acid (per kg)	29.00
Polyvinyl Alcohol Powder (per kg)	150.00
Pentaerythritol (per kg)	52.00
Phthalic Anhydride (per kg)	45.00
Soda Ash (TAC) (per 75 kgs)	410.00
Soda Ash (TATA) (per 75 kgs)	410.00
Sodium Bicarbonate (TATA) (per 50 kgs)	390.00
Sodium Silicate (per MT)	3,800.00
Sodium Bichromate (per kg)	28.00
Sodium Nitrate (per kg)	8.00
Sodium Nitrite (per kg)	26.00
Sodium Sulphide Flakes (per kg)	20.00
Sodium Bisulphite (per kg)	8.00
Sodium Alginate (per kg)	310.00
Sodium Acetate (per kg)	7.50
Sodium Sulphate (Anhydrous) (per kg)	4.00
Titanium Dioxide (Anatase) (per kg)	65.00
Titanium Dioxide (Rutile) (per kg)	85.00
Trisodium Phosphate (per kg)	9.50
Urea (Technical) (per kg)	4.00
Zinc Oxide (per kg)	51.00
Zinc Chloride Powder (per kg)	14.00
Zinc Sulphate (per kg)	8.00

SOLVENTS

Acetone -- HOCL (per kg)	24.00
Butanol (per kg)	35.00
Butyl Acetate (per kg)	40.00
Benzene (per lit)	14.00
Cellosolve (per kg)	65.00
Carbon Tetra Chloride (per kg)	23.00
Chloroform (per kg)	28.00
Diacetone Alcohol (per kg)	30.00
Diethylene Glycol (per kg)	38.00
Dichloroethane (per kg)	18.00
Di-octyl Phthalate (per kg)	50.00
Di-N-butyl Phthalate (per kg)	50.00
Ethyl Acetate (per kg)	24.00
Isopropyl Alcohol (per kg)	32.00
Methanol (per kg)	12.00
Methylene Chloride (per kg)	23.00
Methyl Ethyl Ketone (per kg)	37.00
Methyl Isobutyl Ketone (per kg)	41.25
Phenol (per kg)	55.00
Sorbitol (per kg)	15.00
Triethanolamine (per kg)	95.00
Trichloroethylene (per kg)	26.50
1-1-1 Trichloroethane (per kg)	29.00
Turpentine (per lit)	16.00
Toluene (per lit)	16.00
Xylene (per lit)	27.00

Shipping News

VESSELS DUE IN BOMBAY FOR EXPORT LOADING

Due Date (1)	Steamer's Name & Flag (2)	Agents (3)	Will load for (4)	Approx. sailing dt. (5)
6/10	Eagle Nova	F.F.C. Co.	Jeddah; P. Sudan; Hodeidah. (Carting at Timber Pond No. 1).	11/10
10/10	Kapitan Kud (Rus)	Transocean/	Tilbury; Avonmouth; Liverpool; Manchester; London; Felixstowe; Birmingham; Antwerp; (Rotterdam); Hamburg; Bremen; Copenhagen; Gothenburg; Oslo; Stockholm; Malmao; Leeds. (Carting at TP No. 3).	14/10
		I.S.S. Co.	Felixstowe; Tilbury; Antwerp; Rotterdam; Hamburg; Bremerhaven & Scandinavian Ports via Hamburg. (Carting at E-Grain Depot).	
6/10	Ever Bridge (V-039) (Pan)	Greenways	Hamburg; Felixstowe; Rotterdam; Antwerp; Le Havre; London; Liverpool; Leixoes; Lisbon; Manchester; Avonmouth; Wembley; Birmingham; Leeds; Leicester; Amsterdam; Bremen; Copenhagen; Aarhus; Gothenburg; Oslo; Stockholm; Helsinki; Belfast & All Destinations U.K.; Germany; Switzerland and Austria. (Carting at G/H Cotton Depot).	12/10
10/10	Vishva Parijat (Ind)	S.C.I.	P. Said; Felixstowe; Hamburg; Rotterdam; Antwerp; Bremen; Liverpool; Manchester; Avonmouth; London; Belfast; Aarhus; Oslo; Helsinki; Copenhagen; Gothenburg; and all Inland destinations. (Carting at B. Pier Extn. & CFS No. 4 Kalamboli).	15/10
6/10	Eagle Nova	F.F.C. Co.	Colombo, Rangoon. (Carting at Timber Pond No. 1).	11/10
1/10	Haima (UAE)	Atlantic	Karachi (Afghanistan).	12/10
6/10	Ever Bridge (V-039) (Pan)	Greenways	Singapore; Penang; Port Kelang; Bangkok; Djakarta; Surabaya; Manila; Cebu; Kaohsiung; Keelung; Osaka; Yokohama; Kobe; Shimizu; Moji; Nagoya; Busan; Hongkong. (Carting at G/H Cotton Depot).	11/10
6/10	Eagle Nova (V-022) (Ger)	F.F.C. Co.	Penang; P. Kelang; Singapore; Bangkok; Jakarta; (T. Priok); Hongkong; Manila; Busan; Keelung; Kaohsiung; Kobe; Yokohama; Nagoya; Osaka; Tokyo; Tsingtao; Dairen; Quangzhou; Whampoa; Shanghai; Hsingkang. (Carting at Timber Pond No. 1).	11/10
6/10	Eagle Nova	F.F.C. Co.	Brisbane; Fremantle; Sydney; Melbourne; Adelaide. (Carting at T.P. No. 1).	11/10
6/10	Eagle Nova (V-022)	F.F.C. Co.	Dubai; Sharjah; Abu Dhabi; Doha; Muscat; Dammam; Riyadh; Bahrain. (Carting at Timber Pond No. 1).	11/10
1/10	Haima (UAE)	Atlantic	Dubai; Sharjah.	12/10
4/10	Gulf Spirit (V-03W)	Jades Ship	Dubai; Sharjah.	10/10
10/10	Banglar Robi	Sai Ship	Dubai	15/10
3/10	Any (Pan)	SDS Corp.	P. Louis; Tamatave; Re Union.	10/10
10/10	Banglar Robi	Sai Ship	Mogadiscio; Mombasa; Dar Es Salaam.	15/10
14/10	Hoegh Cairn	Patvolk	Montreal & Toronto Via Halifax; New York; Boston; Norfolk; Charleston; Houston; Savannah; Wilmington; Philadelphia; Baltimore; New Orleans; & FCL Chicago; Milwaukee; Atlanta; Dallas. (Carting at H.B. No. 5).	19/10
6/10	Eagle Nova (Voy-022)	F.F.C. Co.	Los Angeles (Harbour); Longbeach; San Francisco; Oakland; Seattle; Vancouver (B.C.); Portland; New York; Boston; Norfolk; Baltimore; Charleston; Savannah; Miami; New Orleans; Houston; Montreal; Toronto; Fortworth; Chicago; Nashville; Atlanta; Philadelphia; Milwaukee; Kansas City; Phoenix; Guam; Dallas; Cleveland; St. Louis; Cincinnati; Denver; Louisville; Memphis; Wilmington (B.C.); San Diego; Minneapolis; Indianapolis & Central American Ports; Honolulu. (Carting at Timber Pond No. 1).	11/10
10/10	Kapitan Kud	Marathon	Boston; New York; Baltimore; Norfolk. (Carting at T.P. No. 3).	14/10
6/10	Ever Bridge (Voy-039)	Greenways	New York; Newark; Baltimore; Charleston; New Orleans; Houston; Boston; Provience (RI); Philadelphia; Norfolk; Savannah; Jacksonville; Wilmington; Miami; Montreal; Toronto; Bermuda; Los Angeles; Longbeach; San Francisco; Oakland; San Diego; Stockton; Richmond; Almeida; Redwood City; Sacramento; Seattle; Portland; Vancouver (B.C.); Tacoma; Longview; Chicago; Dallas; Various inland destinations and Caribbean Ports. (Carting at G/H Cotton Depot).	12/10

	(2)	(3)	(4)	(5)
10	Vishva Parijat (Ind)	S.C.I.	New York; Baltimore; Savannah; Norfolk; Charleston; Houston; Jacksonville; New Orleans; Boston; P. Everglades. (Carting at B. Pier Extn. & CFS Shed No. 4 Kalamboli).	15/10

VESSELS DUE FOR IMPORT DISCHARGE

e Date	Steamer's Name	Agents	From
/10	Al Hina	Galaxy	Dubai
/10	Banglar Robi	Sai Ship	E. Africa
/10	Ciovo	Damani	Brazil
/10	Hoegh Cairn	Patvolk	U.S.A.
5/10	Jala Godavari	S.C.I.	Japan/Far East
0/10	Kapitan Kud	Transocean	U.K. Cont.
2/10	Vishva Pankaj	S.C.I.	U.K. Cont.
0/10	Vishva Parijat	S.C.I.	U.K. Cont./U.S.

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Materials Exported/Imported

MATERIALS IMPORTED BOMBAY (18.5.90 to 21.5.1990)

ISOPROPYL ALCOHOL: From Taiwan: Hanuman Vitamin Foods Ltd., 12,800 Kgs., Rs. 1,63,066.

L-LYSINE MONO HCL FEED GRADE: From Japan: Indian Veterinary Pharm, 2,500 Kgs., Rs. 1,48,337.

LINALOOL: From UK: Sun Export Corpn., 1,050 Kgs., Rs. 1,09,943.

LITHOPONE: From Czechoslovakia: Peejay Chemicals, 25,000 Kgs., Rs. 2,02,000.

META DICHLORO BENZENE TECH: From FRG: Jal Ltd., 1,000 Kgs., Rs. 74,213.

METHACRYLIC ACID: From Japan: Wockhardt Ltd., 1,710 Kgs., Rs. 70,128.

METHANE SULPHONYL CHLORIDE: From USA: Glaxo India Ltd., 1,088 Kgs., Rs. 88,371.

DL METHIONINE (FEED): from Japan: Ventri Chemicals P. Ltd., 2,000 Kgs., Rs. 89,002.

3 METHOXY PROPYLAMINE: From Japan: Jaysynth Dyechem Ltd., 2,625 Kgs., Rs. 1,71,759.

METHYLETHANOLAMINE: From FRG: German Remedies Ltd., 1,260 Kgs., Rs. 74,294.

MOLYBDENUM TRIOXIDE: From Japan: Sudarshan Chemical Inds., 1,000 Kgs., Rs. 1,25,301.

N-PENTANE 99%: From FRG: Himatlal M. Joshi, 475 Kgs., Rs. 23,637.

NOVOLDIAMINE: From FRG: E. Merck (India) Ltd., 4,950 Kgs., Rs. 19,87,722.

ORTHANILIC ACID: From FRG: Metro Chem Inds., 2482.74 Kgs., Rs. 5,17,415.

PARAFORMALDEHYDE 96% PRILLS: From Spain: Goodlass Nerolac Paints Ltd., 16 Mts., Rs. 1,46,591.

PARAQUAT DICHLORIDE: From Taiwan: Herbicides (India) Ltd., 8,360 Kgs., Rs. 5,32,512.

AMINO PICOLINE: From Switzerland: Ranbaxy Labs. Ltd., 3,000 Kgs., Rs. 5,57,573.

GAMMA PICOLINE: From Japan: D.P. Chem. P. Ltd., 3,000 Kgs., Rs. 1,57,063.

POLYETHER POLYOL: From Belgium: Natson Foam Mfg. Pvt. Limited, 16,480 Kgs., Rs. 2,93,110.

POLYPROPYLENE GLYCOL: From Japan: Hico Products Ltd., 16 Mts., Rs. 3,49,028.

POLYVINYL ALCOHOL: From Japan: Fabrics Wvg. Factory, 2,000 Kgs., Rs. 80,277; Pidilite Inds. Ltd., 17 Mts., Rs. 5,92,811

POLYVINYL PYRROLIDONE: From FRG: Cadila Antibiotics P. Ltd., 400 Kgs., Rs. 92,422; Parke Davis (India) Ltd., 250 Kgs., Rs. 62,267.

POLYVINYL PYRROLIDONE K 90: From USA: Roche Products Ltd., 320 Kgs., Rs. 81,329.

POTASSIUM CARBONATE: From Taiwan: G. Amphray Labs., 20,000 Kgs., Rs. 2,16,396

PROPIONYLAMINO N,N DIETHYL ANILINE: From Japan: Sandoz India Ltd., 5,148 Kgs., Rs. 13,62,326.

PROPYLENE GLYCOL: From USA: Pfizer Ltd., 16,770 Kgs., Rs. 3,07,293; From Japan: Jewel Polymers P. Ltd., 7.98 Mts., Rs. 1,30,210.

PROPYLENE GLYCOL (TECH): From Japan: Vikram Resins & Polymers, 16,170 Kgs., Rs. 2,68,080; From Singapore: Dr. Beck & Co. Ltd., 17,200 Kgs., Rs. 2,79,153.

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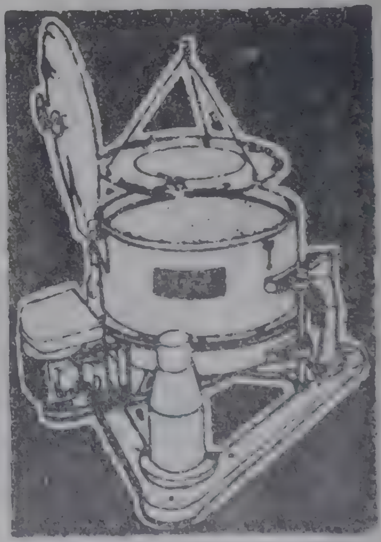

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8.6 Mts., Rs. 1,59,087; From Japan: Asian Chemical Works P. Ltd., 16.17 Mts., Rs. 2,97,163.

SILICA: From FRG: Gopal Bros., 15,000 Kgs., Rs. 2,74,484.

THEOPHYLLINE ANHYDROUS BP 80: From China: Cipla Ltd., 2,000 Kgs., Rs. 3,28,086.

THIOPHENOL: From USA: Hoechst India Ltd., 1,000 Kgs., Rs. 1,30,886.

TITANIUM DIOXIDE ANATASE: From China: Harkab Holding P. Ltd., 28 Mts., Rs. 6,74,328.

TITANIUM DIOXIDE: From China: Harkab Holding P. Ltd., 7 Mts., Rs. 1,68,580; Neelraj Chemicals, 16,750 Kgs., Rs. 3,68,396; From UK: Goodless Nerolac Paints Ltd., 20 Mts., Rs. 99,42,375.

TITANIUM DIOXIDE RUTILE: From USA: Goodlass Nerolac Paints Ltd., 30,000 Kgs., Rs. 13,61,209.

TITANIUM DIOXIDE: From USA: Royal Cushion Vinyl Products, 15,000 Kgs., Rs 6,80,605; From Yugoslavia: Bharat Pipes & Fittings, 20 Mts., Rs. 9,24,924.

TRIMELLITIC ANHYDRIDE: From USA: Twin Hill Paints, 2,250 Lbs., Rs. 46,224.

3,4,5 TRIMETHOXY BENZALDEHYDE: From China: G. Amphray Labs., 500 Kgs., Rs. 1,91,685.

TRIMETHYLOLPROPANE: From Sweden: Asian Paints (I) Ltd., 16,000 Kgs., Rs 4,46,756.

3,5 XYLENOL 90% PURE: From FRG: Anand Syntho Chem P. Ltd., 2 Mts., Rs. 1,99,255.

DRUG MATERIALS IMPORTED BOMBAY
(From 18.5.90 to 21.5.90)

CHLORZOXAZONE USP: From Taiwan: Duphar Interfran Ltd., 200 Kgs., Rs. 82,519.

ETHOXY METHYLENE MALONIC ACID ESTER: From FRG: Sharvani Pharmls Ltd., 5,000 Kgs., Rs. 11,25,626.

IMIDAZOLE: From Japan: Jal Ltd., 600 Kgs., Rs. 79,578.

INDOMETHACIN BP: From China: Bombay Pharma Products, 200 Kgs., Rs. 76,055.

INDOMETHACIN BP 80: Kantilal Manilal & Co., 200 Kgs., Rs. 75,642.

LEVAMISOLE HCL BP 80: From China: Rallis India Ltd., 100 Kgs., Rs. 58,732.

PENCILLIN G. POTASSIUM: From Netherlands: Lupin Labs. Ltd., 1,000 Kgs., Rs. 22,94,859.

SALICYCLAZOSULPHAPYRIDINE: From Sweden: Wallace Pharmls. Ltd., 1,000 Kgs., Rs. 14,09,826.

SULPHADOXINE BP 80: From China: Fytomed Formulations P. Ltd., 250 Kgs., Rs. 2,67,334.

THIOBROMINE: From FRG: Hoechst India Ltd., 3,000 Kgs., Rs. 37,69,583.

THEOPHYLLINE ANHYDROUS: From China: Malar Agency, 1,000 Kgs., Rs. 1,54,723.

THEOPHYLINE ANHYDROUS BP 80: From China: German Remedies Ltd., 3,000 Kgs., Rs. 4,86,894; Sarvodaya Enterprises, 1,000 Kgs., Rs. 1,54,723.

THEOPHYLLINE ANHYDROUS IP: From China: Indo Pharm. P. Ltd., 500 Kgs., Rs. 82,022.

PLASTICS MATERIALS IMPORTED BOMBAY
(From 18.5.90 to 21.5.90)

HDPE: From Argentina: Borana Plastics, 10 Mts., Rs. 1,50,431; From Czechoslovakia: Associated Plastics Inds., 12.5 Mts., Rs. 1,42,031; Kalpesh Plastic Inds., 12.5 Mts., Rs. 1,42,031; Valia Impex P. Ltd., 37.5 Mts., Rs.

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4,26,093; 12.5 Mts., Rs. 14,20,314; From Japan: Gilt Pack Ltd., 100 Mts., Rs. 16,81,310; Kanpur Plastipack Ltd., 100 Mts., Rs. 16,67,338; Karan Synthetic P. Ltd., 50 Mts., Rs. 8,41,137; From Korea: Garware Supermarket P. Ltd., 30 Mts., Rs. 4,57,239; Premukh Filaments P. Ltd., 20 Mts., Rs. 3,36,702; Priyadarshini Filaments., 10 Mts., Rs. 1,68,351; Sanjeevani Enterprises, 10 Mts., Rs. 1,68,351; Shrifabs I. P. Ltd., 16 Mts., Rs. 2,62,790; The Supreme Inds. Ltd., 50 Mts., Rs. 8,65,558; Suvasini Filaments, 20 Mts., Rs. 3,36,702; Tirupati Intl., 16 Mts., Rs. 2,60,622; From Saudi Arabia: Bharat Cottage Inds., 51.45 Mts., Rs. 8,12,577; Cello Plastic Indl. Works, 34.4 Mts., Rs. 5,41,718; Dawood & Dawood P. Ltd., 102.9 Mts., Rs. 16,16,172; Metsukoshi Thermo Ware, 68.6 Mts., Rs. 8,49,988; Nilkamal Crates & Containers, 51.45 Mts., Rs. 8,41,137; Plastika Inds., 51.45 Mts., Rs. 8,57,470; Radhika Enterprises 33 Mts., Rs. 4,95,271; Ruby Products, 17.15 Mts., Rs. 2,70,859; Texoplast, 51.45 Mts., Rs. 8,48,492; Tirupati Intl., 16.5 Mts., Rs. 2,29,748; 8.25 Mts., Rs. 1,14,874; Wimco Pen Co., 34.3 Mts., Rs. 5,41,718; From Turkey: Calcutta Rope Stores, 16 Mts., Rs. 2,39,306; From USA: Anand Engg Udyog, 17.5 Mts., Rs. 2,74,859; Radhika Enterprises, 16.2 Mts., Rs. 2,12,034; From Yugoslavia: Corn Products Co. Ltd., 30 Mts., Rs. 5,31,634; Pan Asia Intl. P. Ltd., 5 Mts., Rs. 74,569; 25 Mts., Rs. 4,22,845; 5Mts., Rs. 74,569; 15 Mts., Rs. 2,53,713; 5 Mts., Rs. 84,575; Ravi Intl., 36 Mts., Rs. 6,27,377; 9 Mts., Rs. 1,52,187.

LDPE: From Korea: Shri Hanuman Overseas Corpn., 10 Mts., Rs. 1,33,504; From Kanada: Radhika Enterprises, 25 Mts., Rs. 2,47,128; From Saudi Arabia: Uniplast India Ltd., 148.5 Mts., Rs. 22,80,549.

POLYACETAL RESIN: From Japan: Urvi Plastic Inds., 12 Mts., Rs., 4,18,822.

POLYBUTENE: From USA: Indtech Speciality Chemicals Ltd., 11.875 Mts., Rs. 1,78,222.

POLYETHER POLYOL: From Belgium: Natson Foam Mfg. P. Ltd., 16,480 Kgs., Rs. 2,93,110; From FRG: Antofit P. Ltd., 30,960 Kgs., Rs. 5,94,324.

POLYETHYLENE: From USA: Angel Plastics Ltd., 250 Kgs., Rs. 15,052.

POLYPROPYLENE: From Australia: Rajasthan Petro Synthetic Ltd., 16 Mts., Rs. 2,37,339; From Canada: Grover Overseas P. Ltd., 30 Mts., Rs. 4,08,360; K. Raheja Mercantile Corpn., 15 Mts., Rs. 2,00,255; White Feather Pen Co., 15 Mts., Rs. 2,12,034; From Czechoslovakia: Associated Bros., 14 Mts., Rs. 1,39,986; From Spain: Gilt Pack Ltd., 90 Mts., Rs. 12,17,238; M.V. Subramanian, 45 Mts., Rs. 6,20,108; From USA: Deccan Polypacks Ltd., 17 Mts., Rs. 2,43,273; Liberty Traders 17 Mts., Rs. 2,67,672; 85 Mts., Rs. 10,38,360; From Yugoslavia: Propylon Products 15.5 Mts., Rs. 2,60,565.

POLYSTYRENE: From Korea: Godrej & Boyce Mfg. Co. Ltd., 68 Mts., Rs. 13,64,700; Krishna Intl., 51 Mts., Rs. 10,90,878.

POLYSTYRENE EXPANDABLE: From Korea: N.M. Nagpal P. Ltd., 12 Mts., Rs. 3,05,079.

PVC RESIN: From Belgium: Cable Corpn of India Ltd., 48.75 Mts., Rs. 5,99,805; Caprihans India Ltd., 4 Mts., Rs. 50,958; From Brazil: Ajanta Tubes Ltd., 112 Mts., Rs.13,18,198; Anant Extrusions P. Ltd., 96 Mts., Rs. 11,25,878; Finolex Pipes Ltd., 1,000 Mts., Rs. 1,14,82,869; From France: Metro Packagings P. Ltd., 17 Mts., Rs. 2,08,929; From FRG: The National Leather Cloth Mfg. 78,750 Kgs., Rs. 13,72,993; Northern India Leather Cloth, 12.5 Mts., Rs. 2,47,798.

PTFE: From FRG: TFE Coating Inds., 500 Kgs., Rs. 1,17,797; From Japan: Plastic Products Engineering Company, 500 Kgs., Rs. 1,26,523; 8,000 Kgs., Rs. 2,53,046.

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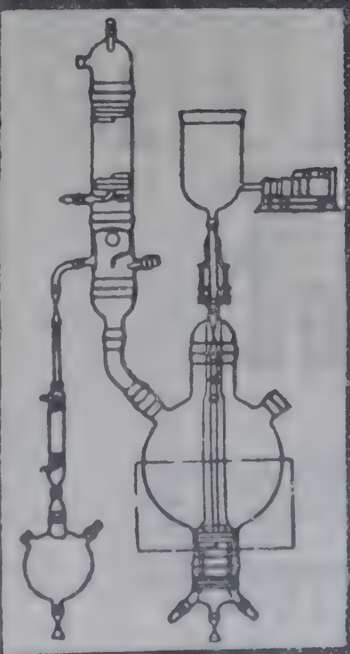

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PLASTIC MATERIALS IMPORTED MADRAS

(From 2.5.90 to 15.5.90)

HDPE: From FRG: Madura Coats Ltd., 11 Mts., Rs. 4,47,307; From Japan: Aksa Polybags P. Ltd., 15 Mts., Rs. 2,57,311; 15,000 Kgs., Rs. 2,57,311; Anand Plastics, 16,500 Kgs., Rs. 2,83,198; Panchavathi Polyfibres Ltd., 50 Mts., Rs. 8,49,228; Ram Filaments, 8,250 Kgs., Rs. 1,41,046; Reliance Plastic P. Ltd., 30 Mts., Rs. 5,12,224; Reliance Plastics P. Ltd., 30 Mts., Rs. 5,12,224; Salguti Chemplast P. Ltd., 16,500 Kgs., Rs. 2,81,652; Sree Karthikeya Inds., 10 Mts., Rs. 1,69,722; Sri Rama Poly Bags., 15 Mts., Rs. 2,55,373; Sumitra Plastics Ltd., 100 Mts., Rs. 16,64,980; From Korea: Amco Batteries Ltd., 8 Kgs., Rs. 1,432; Asian Bags P. Ltd., 20,000 Kgs., Rs. 3,38,836; Bright Packaging P. Ltd., 16 Mts., Rs. 2,62,760; Digvijay Polytex P. Ltd., 55 Mts., Rs. 9,24,104; Digvijai Polytex P. Ltd., 15 Mts., Rs. 2,52,034; From Singapore: Impex P. Ltd., 189 Mts., Rs. 24,40,753; Intergrated Exp. 8.25 Mts., Rs. 1,19,876; 24.75 Mts., Rs. 3,59,358; 24.75 Mts., Rs. 3,98,082; 8.25 Mts., Rs. 1,19,786; 18.25 Mts., Rs. 1,19,786; Jayalakshmi Chemicals P. Ltd., 8.25 Mts., Rs. 1,32,694; Peacock Polymers P. Ltd., 96 Mts., Rs. 16,20,659; Priya Filaments, 20 Mts., Rs. 3,27,842; Quality Filaments, 20 Mts., Rs. 3,36,284; S.S. Laminates P. Ltd., 32 Mts., Rs. 5,21,952; Sandoz Polysacks, 16 Mts., Rs. 2,61,869; 16 Mts., Rs. 2,61,869; Sri Rama Poly Bags., 20 Mts., Rs. 3,28,223; Super Polytex P. Ltd., 10 Mts., Rs. 1,48,769; Sumitra Plastics Ltd., 48 Mts., Rs. 7,78,161; 96 Mts., Rs. 15,56,320; From UAE: JK Sayani Enterprises, 17,150 Kgs., Rs. 2,78,341; National Products, 34.3 Mts., Rs. 5,14,782; Sunshine Plastics Inds., 17.15 Mts., Rs.2,78,341; White & Co., 34.3 Mts., Rs. 5,14,782; From USA: Blowplast Inds., 14.375 Mts., Rs. 1,98,183; From USA: Earnest Decopack Inds. P. Ltd., 15 Mts., Rs. 2,15,961; Hi-Mol Inds., 30 Mts., Rs. 4,26,690; Indian Plastics, 14,375 Kgs., Rs. 1,98,183; Marine Nets Corporation, 17,500 Kgs., Rs. 2,77,914; 17.5 Mts., Rs. 2,77,914; Safeguard Pkg. Systems Pvt. Limited, 34 Mts., Rs. 5,38,032.

LDPE: From China: Barium Plastic Co., 5 Mts., Rs. 78,805; From Korea: Kohinoor Metamart, 16.5 Mts., Rs. 2,47,636; From Singapore: Indo National Ltd., 16 Mts., Rs. 2,67,252; ITC Ltd., 300 Kgs., Rs. 18,062; Peacock Polymers P. Ltd., 5 Mts., Rs. 82,931.

POLYETHYLENE: From France: M.M. Rubber Co. Ltd., 3 Mts., Rs. 81,186; From Japan: Ram Filaments, 8,250 Kgs., Rs. 1,41,046.

POLYPROPYLENE: From Belgium: Kunal Engg. Co. Ltd., 30 Mts., Rs. 5,39,248; From France: M.M. Rubber Co. Ltd., 97,500 Kgs., Rs. 19,03,028; From FRG: Mani & Co., 45 Mts., Rs. 8,95,303; From Japan: Beejay Pee Sacks P. Ltd., 60 Mts., Rs. 8,96,124; 15,500 Kgs., Rs. 2,33,769; From Korea: Abirami Polybag Inds., 15 Mts., Rs. 2,20,567; Anu Poly Inds., 12 Mts., Rs. 1,74,693; Apco Plastic Inds., 15 Mts., Rs. 2,15,582; Emelem Poly Sacks Inds., 20 Mts., Rs. 2,87,299;

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POLYSTYRENE: From Korea: Beardsell Ltd., 34 Mts., Rs. 8,33,346.

POLYOL: From Singapore: Jay Foam P. Ltd., 16,380 Kgs., Rs. 3,19,989.

PVC RESIN: From Korea: Polytrusions P. Ltd., 160 Mts., Rs. 19,78,044.

MATERIALS IMPORTED MADRAS (From 16.5.90 to 31.5.90)

ACETYL CHLORIDE: From USA: Cheminor Drugs Ltd., 14,040 Kgs., Rs. 3,12,526.

ACETYL CHLORIDE 90%: From FRG: Cheminor Drugs Ltd., 14,040 Kgs., Rs.3,28,283.

N-ACETYL SULPHANILYLCHLORIDE: From Japan: STD Organics Ltd., 40 Mts., Rs. 17,08,527.

AEROSIL 200: From Belgium: SOL Pharmls., 500 Kgs., Rs. 70,146.

ALLYL CHLORIDE: From Japan: Grauer & Weil (India) Ltd., 14.4 Mts., Rs. 3,48,051; Tata Exports Ltd., 3,600 Kgs., Rs. 74,762.

ALUMINA: From Japan: Elcera Substrates Ltd., 10,000 Kgs., Rs. 1,93,581.

ALUMINIUM OXIDE: From Hong Kong: Carborundum Universal Ltd., 20 Mts., Rs. 1,88,476.

AMMONIUM ADIPATE: From Japan: Keltron Component Complex, 1,000 Kgs., Rs. 64,857.

AMMONIUM PENTABORATE: From Japan: Keltron Component Complex Ltd., 4,000 Kgs., Rs. 2,00,045.

AMMONIUM PERSULPHATE: From FRG: Sarvodaya Chemicals Works, 2,000 Kgs., Rs. 56,930.

AROMATIC CHEMICALS: From FRG: Bush Boake Allen I. Ltd., 500 Kgs., Rs. 1,42,998; From Switzerland: Amber Aromatics, 214 Kgs., Rs. 1,52,468.

BARIUM SULPHATE: From FRG: Hindustan Photo Film Mfg. Co., 200 Kgs., Rs. 2,868.

BENZOTRIAZOLE: From Switzerland: Chemplast, 200 Kgs., Rs. 44,979.

BUTACHLOR TECH 94%: From Hong Kong: Agro Chemical Inds. Ltd., 17,310 Kgs., Rs. 6,70,343.

BUTANEDIOL: From FRG: IOC Ltd., 210 Kgs., Rs. 10,907.

BUTYL ACRYLATE MONOMER: From Singapore: Aum Enterprises, 14,400 Kgs., Rs. 2,76,430.

PARA TERT BUTYL PHENOL: From FRG: Carol Chem P. Ltd., 12 Mts., Rs. 1,41,512.

BUTYLATED HYDROXY ANISOLE: From Japan: DCW Ltd., 200 Kgs., Rs. 59,335.

CALCIUM ALUMINATE: From Netherlands: Carborundum Unviersal Ltd., 6 Mts., Rs. 93,155.

CAPROLACTUM: From Belgium: Shriram Fibres Ltd., 213 Mts., Rs. 63,19,153; From FRG: Shriram Fibres Ltd., 230.75 Mts., Rs. 68,45,749.

CARBAZOLE: From Belgium: Vanavil Dyes & Chemicals, 5,000 Kgs., Rs. 2,96,401.

ORTHO CHLOROPHENYL ACETIC ACID: From Japan: Sunshine Aromatic Co. P. Ltd., 500 Kgs., Rs. 2,00,692.

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